DG
FLUGZEUGBAU GMBH

MAINTENANCE MANUAL

FOR THE SAILPLANE

LS3

TYPE: LS Sailplanes

VARIANT: LS3
LS3-a
LS3-17

TC DATA SHEET NO: EASA.A.095

ISSUED: December 2009

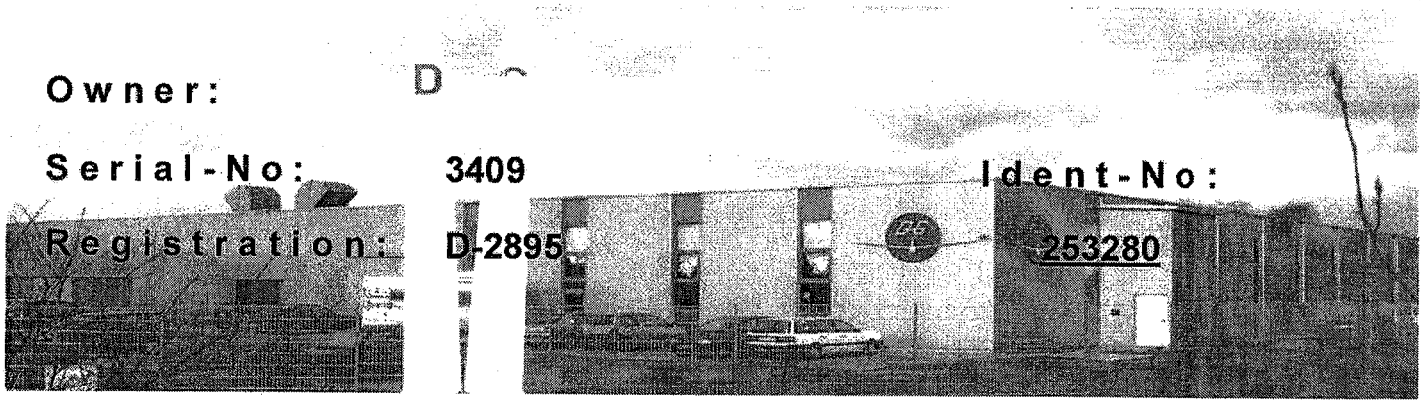
(Changes to and combination of the initial Maintenance Manuals of the Variants LS3, LS3-a, LS3-17)

Owner:

Serial-No: 3409

Registration: D-2895

Ident-No: 253280



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0 General

0.1 Manual amendments

No.	Page	Description	Date
0.1	All	Combination of the initial Maintenance Manuals of the Variants LS3, LS3a and LS3-17, new standardized format	December 2009
0.2	0-8, 1-1, 1-2, 1-3, 2-1, 2-2, 3-1 up to 3-3, 4-1, 4-3, 5-1 up to 5-4, 6-4, 7-2, 8-1 bis 8-5, 9-2, 9-3, 9-7 up to 9-10, 10-1 up to 10-8	Miscellaneous changes to the contents of the latest amendments of the initial maintenance manuals	December 2009

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0.2 List of effective pages

Section	page	issued	replaced	replaced	replaced
0	0-1	December 09			
	0-2	"			
	0-3	"			
	0-4	"			
	0-5	"			
	0-6	"			
	0-7	"			
	0-8	"			
1	1-1	December 09			
	1-2	"			
	1-3	"			
	1-4	"			
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2	2-1	December 09			
	2-2	"			
	2-3	"			
	2-4	"			
	2-5	"			
	2-6	"			
3	3-1	December 09			
	3-2	"			
	3-3	"			
	3-4	"			
		"			
4	4-1	December 09			
	4-2	"			
	4-3	"			
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0.2 List of effective pages (continued)

Section	page	issued	replaced	replaced	replaced
5	5-1	December 09			
	5-2	"			
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6	6-1	December 09			
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7	7-1	December 09			
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8	8-1	December 09			
	8-2	"			
	8-3	"			
	8-4	"			
	8-5	"			
9	9-1	December 09			
	9-2	"			
	9-3	"			
	9-4	"			
	9.5	"			
	9.6	"			
	9.7	"			
	9.8	"			
	9.9	"			
	9.10	"			
	9.11	"			
10	10-1	December 09			
	10-2	"			
	10-3	"			
	10-4	"			
	10-5	"			
	10-6	"			
	10-7	"			
	10-8	"			

0.3 Table of contents

0.4 Airworthiness Limitations

0.4.1 Repairs

Repair or replace damaged parts prior to next flight. Follow the instructions of section 9 of this manual for repairs of the airframe. Major repairs must be accomplished by an approved repair station or by an approved mechanic rated for composite aircraft structure work in accordance with DG repair methods.

Use only genuine spare parts.

For all aircraft under EASA regulations the following applies: According to part 21, subpart M to accomplish major repairs an approved repair instruction is required, see also TN DG-G-01 "Approved repair methods according to EU Commission Regulation 1702/2003 part 21, subpart M"

0.4.2 Life time of the airframe

The maximum allowable operating time of the LS3, LS3-a and LS3-17 is 12000 flight hours. Therefore inspections according to section 3.3 of this manual have to be executed at 3000 h, 6000 h, 9000 h and every 1000 hours following thereafter.

0.4.3 Life time of equipment and components

a) The **fabric straps of the safety harness** have to be exchanged according to the instructions of the respective manufacturer. If no limitations are given, exchange after 12 years.

b) **Other components**:
All other components like tow hook, wheels, gas struts, control system parts, bolts, pins etc. have no life time limitation, but should be replaced when worn, damaged or disqualified by excessive corrosion.

0.4.4 Service time, maintenance documents of equipment and components

Follow the instructions of the respective manufacturer:

a) Operating Manual for Safety Tow Releases
Series: Europa G 72 or Europa G 73 or Europa G 88 Safety Tow Release latest approved version
And if installed:
Operating Manual for Tow Releases Series: E72 or E75 or E 85 Nose Tow Release latest approved version
Safety harness: instructions of the manufacturer.

b) Minimum instrumentation: instructions of the manufacturer.

1 Description of Systems

1.1 Wings

LS3 und LS3a: no wing tip extensions, some special ser. no.'s are equipped with winglets

Only LS3-17: 17 m outer wing panels may be fitted instead of 15 m wingtips.

1.2 Ailerons and wing flaps – control system

1.2.1 LS3 Ailerons and wing flaps – control system

Activation via pushrods, one piece aileron-flap combination (flaperon) with automatic coupling during assembly. Mix control mechanism of both systems inside fuselage. Mass balance distributed over entire length of control surface.

1.2.2 LS3-a and LS3-17: Ailerons and wing flaps – control system

1.2.2.1 Ailerons - control

Activation via pushrods, separate aileron- with ball snap joints in fuselage. Mix control mechanism for aileron and flap deflections inside fuselage.
LS3-a: Ailerons without mass balance.
LS3-a with TB 3028 executed and LS3-17: Ailerons with partial mass balance.

Note: The mass balance improves the aileron control handling.

1.2.2.2 Wingflaps - control

Automatic coupling during assembly.. Mix control mechanism for aileron and flap deflections inside fuselage. Flaps with partial mass balance.
Only LS3-17: Cable to limit the wing flap setting to 0°. Negative flap setting is not permitted for operation with 17 m wing span.

1.3 Elevator

1.3.1 Elevator LS3 and LS3-a

Activation via pushrods. Automatic coupling during assembly of horizontal tail, mass balance at the elevator.

Caution: Several LS3-a are equipped with the elevator system of the LS3-17, see section 1.3.2. (which system is installed may be identified from TB3050 and weather balance-masses are installed at the elevator or at the upper end of the elevator push rod in the fin).

1.3.2 Elevator LS3-17

Activation via pushrods. Automatic coupling during assembly of horizontal tail, mass balance via masses at the vertical control pushrod inside fin. Additional pushrod guide by a bell crank near the rear main bulkhead.

1.3.3 Trim system LS3 and LS3-a without TB 3016

Trim handle at left cockpit wall

1.3.4 Trim system LS3-a with TB 3016 and LS3-17

Trim handle at control stick, trim setting indicator at left cockpit wall. Trim control serves only to adjust for varying pilot masss, while trims required for varying speeds of flight are controlled automatically through flap adjustments.

1.3.5 Trim system LS3-a and LS3-17 with TB 3021

Trim handle at left cockpit wall, trim release handle at control stick

1.4 Rudder Control

Activation via steel cables, mass balance on rudder.

1.5 Wheel Brake

Heel activated, activation via cables connected to rudder pedals.

1.6 Airbrakes

Activation via pushrods. Automatic coupling during assembly. Double storey airbrake plates. Flexible airbrake box covers.

1.7 Water Ballast System

Capacity per tank 75 liters (20 US-gallons). Filling and dump valve located on underside of wing. Twistproof installation of water tanks. Automatic coupling of valve mechanism during assembly.

1.8 Cockpit

Double fiberglass shell. Controls for landing gear, trim, divebrakes and flaps are located on the left side of the cockpit. Divebrake and flap controls are located on the same axis to prevent errors in use. Controls for tow release, pedal adjustment canopy emergency release and ventilation are located on the instrument panel. Water ballast valve control located on right side of cockpit. Backrest and headrest are adjustable. Loudspeaker and microphone are mounted on the headrest.

1.9 Canopy

One piece hinged up front with cover for instrument panel. Instrument cover accommodates compass. Canopy rim includes threads for camera mounts.

1.10 Instrument Panel

Mounted on floor of cockpit. Depending on type allows for installation of up to 8 instruments plus radio. Weight limitation on instruments installed in upper portion of panel 4 kg (8.8 lbs).

1.11 Baggage Compartment

Baggage compartment behind pilot's shoulders is for light and soft materials only. Permanent installation of batteries or other equipment possible, see section 7.2.
Includes a stow arrangement for a winter barograph.

1.12 Oxygen Installation

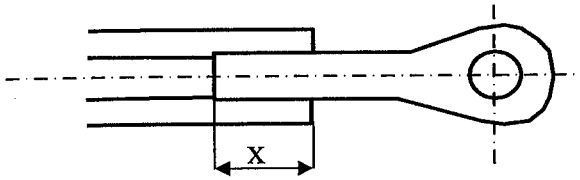
Fiberglass receptacle for 3 liter oxygen bottles of 100 mm diameter (3.94 in.).

1.13 Landing Gear

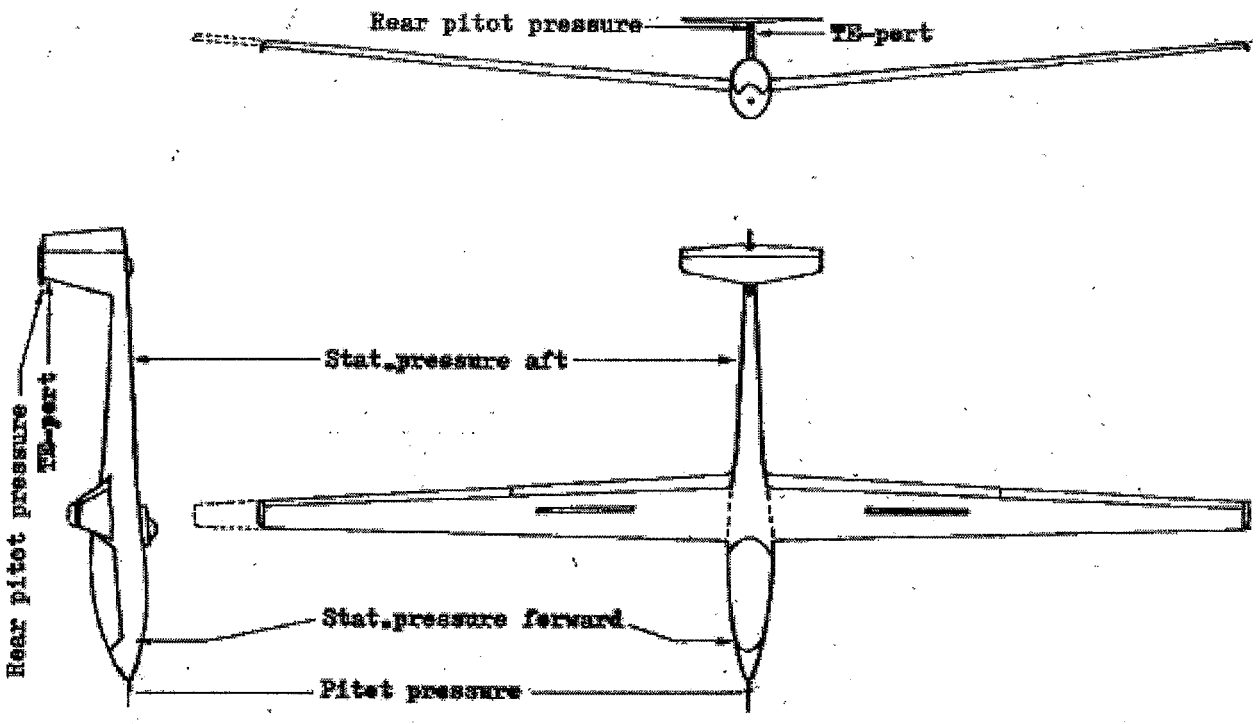
Landing gear is sprung and retractable. It is housed in a closed gearbox. A gas strut in the landing gear drive insures constant preset load and prevents mechanical damage due to errors during assembly..

Caution: when working at control systems
Protection against corrosion (humidity entering pushrods) required formerly used inspection openings to check minimum reach of thread to be dropped.
Rod end bearings used may have different thread lenght with identical heads. Therefore, before adjusting rod end bearings, remaining thread reach must be checked by dismantling.

Thread diameter	Minimum reach x	Rod end designation
M6 x 1 (Standart)	17 mm / 0.67 in	EM 6 R (used in single cases only)
M8 x 1,25 (Standart)	17 mm / 0.67 in	variuos versions possible
M10 x 1 (Fine thread)	17 mm / 0.67 in	PM 6 long



1.14 Pressure Ports



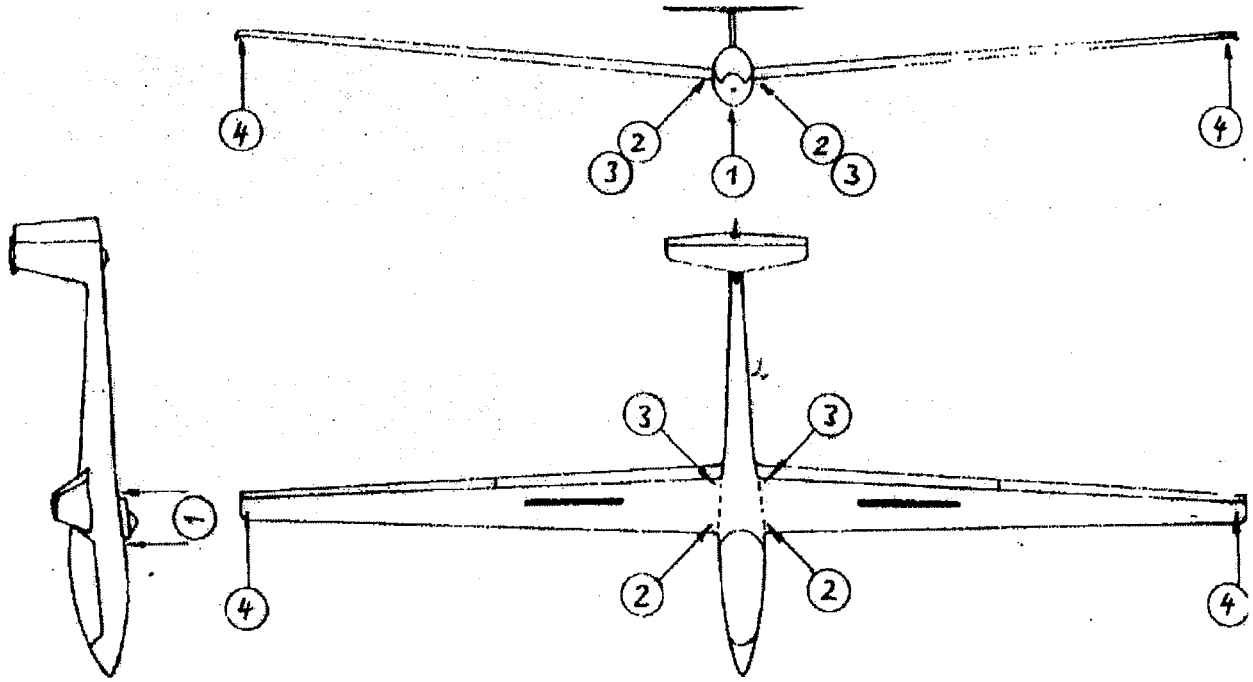
1.15 Marking of instrument lines

The following colour coding is used on cockpit end of the hoses:

Red = pitot pressure
Blue = static pressure forward
Yellow = static pressure aft
Green = pressure port for TE probe (total energy probe).

In addition three tubes without colour marking are installed from the vacuum bottle stowage compartment.

1.16 Drain orifices

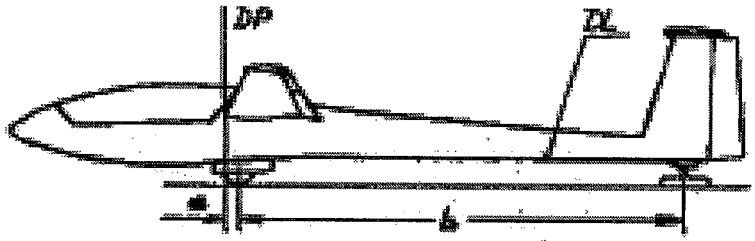


2 Weight and balance

2.1 Weighing procedure

DATUM LINE <DL): Under side of fuselage boom placed horizontal
DATUM POINT (DP): Leading edge of wing at root

1. Determine total mass by weighing all parts and adding together. For inflight C.G. position, the pilot's mass must be added too.
2. Assemble sailplane. For inflight C.G., the pilot must be seated in the sailplane.
3. Raise tail on weighing machine until datum line is level using wooden blocks or adjustable jack. (Check with leveling gauge)
4. Measure distance (b) from tail support to centre of landing gear axis
5. Using plumb lead, determine points on floor perpendicular to left and right datum points, and points on floor perpendicular to centre of landing gear axis. Measure distance <a> from wheel axis to datum point.



6. Determine tail load and deduct mass of auxiliary support used under 3) to get net tail load.

7. Calculate C.G. position:

$$Xcg = \frac{(\text{net tail load} * b}{\text{empty mass}} + a$$

2.2 Calculation of loading limits

1. Determine Minimum Cockpit Load from table "Empty mass C.G. limits", see section 2.3.
   When being used for club operation, Minimum Cockpit Load should be 70 kg (154 lbs). If it is higher, permanent ballast may be fitted under the forward seat portion, see section 7.
   Finally resulting Minimum Cockpit Load should be entered in the following places:
   1. in weighing report of inspection
   2. in Flight Manual page 1-8
   3. under instrument panel cover
   4. on Data Placard in cockpit

2. Determine Maximum Cockpit Load from table "Empty mass C.G. limits", see section 2.3.
   Maximum Cockpit Load normally should be 110 kg <242 lbs>, when being used for club operation.
   Maximum Cockpit Load may be lower due to excessive equipment or repairs.
   Therefore check if the Maximum approved mass of non-lifting parts Mnlp isn't exceeded.
   Mnlp= payload in cockpit + empty fuselage mass + mass of HT
   Maximum approved mass of non-lifting parts
   LS3: 240 kg <529 lbs.>
   LS3-a und LS3-17: 230 kg <507 lbs.>
   If the Maximum approved mass of non-lifting parts is exceeded the Maximum Cockpit Load must be reduced accordingly.
   Resulting Maximum Cockpit Load should be entered in the following places:
   1. in weighing report of inspection
   2. in Flight Manual, page 1-8
   3. on Data Placard in cockpit

3. Empty mass (perhaps increased by mass of permanently fitted trim ballast) should be entered in the following places:
   1. in weighing report of inspection
   2. in Flight Manual, page 1-8 for calculation of maximum permissible water ballast mass

   For permanent installation of trim ballast masss see section 7.1.

2.3 Empty mass C.G. limits

	Empty mass C.G. (mm)									
Empty mass	rear limit at min. cockpit load of (kg)							forward limit at max. cockpit load of (kg)		
(kg)	60	65	70	75	80	85	90	100	105	110
240	633	652	671	690	709	728	748	598	615	633
241	632	651	670	688	708	727	747	596	614	632
242	631	650	669	687	706	726	745	595	612	630
243	630	649	668	686	705	724	744	594	611	628
244	629	648	667	685	704	723	742	592	609	627
245	628	647	665	684	703	722	741	591	608	625
246	628	646	664	683	701	720	740	589	606	624
247	627	645	663	681	700	719	738	588	605	622
248	626	644	662	680	699	718	737	587	604	621
249	625	643	661	679	698	716	735	585	602	619
250	624	642	660	678	697	715	734	584	601	618
251	623	641	659	677	695	714	733	583	599	616
252	622	640	658	676	694	713	731	581	598	615
253	621	639	657	675	693	711	730	580	597	613
254	620	638	656	674	692	710	729	579	595	612
255	620	637	655	673	691	709	728	577	594	611
256	619	636	654	672	690	708	726	576	592	609
257	618	635	653	671	689	707	725	575	591	608
258	617	635	652	669	687	705	724	574	590	606
259	616	634	651	668	686	704	722	572	589	605
260	615	633	650	667	685	703	721	571	587	604
261	614	632	649	666	684	702	72o	570	586	602
262	614	631	648	665	683	701	719	569	585	601
263	613	630	647	664	682	700	718	567	583	600
264	612	629	646	663	681	698	716	566	582	598
265	611	628	645	662	680	697	715	565	581	597
266	610	628	644	661	679	696	714	564	580	596
267	610	627	644	660	678	695	713	563	578	594
268	609	626	643	659	677	694	712	562	577	593
269	608	625	642	658	676	693	710	560	576	592
270	607	624	641	657	675	692	709	559	575	591
271	607	623	640	657	674	691	708	558	574	589
272	606	622	639	656	673	690	707	557	572	588
273	605	622	638	655	672	689	706	556	571	587
274	604	621	637	654	671	688	705	555	570	585

Empty mass C.G. limits cont.

	Empty mass C.G. (mm)									
Empty mass	rear limit at min. cockpit load of (kg)							forward limit at max. cockpit load of (kg)		
(kg)	60	65	70	75	80	85	90	100	105	110
275	604	620	636	653	670	687	704	554	569	584
276	603	619	636	652	669	685	703	553	568	583
277	602	618	635	651	668	684	702	551	567	582
278	601	618	634	650	667	683	700	550	565	581
279	601	617	633	649	666	682	699	549	564	580
280	600	616	632	648	665	681	698	548	563	578
281	599	615	631	647	664	680	697	547	562	577
282	599	615	631	647	663	679	696	546	561	576
283	598	614	630	646	662	678	695	545	560	575
284	597	613	629	645	661	677	694	544	559	574
285	596	612	628	644	660	676	693	543	558	573
286	596	612	627	643	659	676	692	542	557	572
287	595	611	627	642	658	675	691	541	555	570
288	594	610	626	641	658	674	690	540	554	569
289	594	609	625	641	657	673	689	539	553	568

Examples:

For empty mass ***275*** kg and empty mass C.G. position ***659*** mm the minimum Cockpit load is ***70*** kg <, the max. Cockpit load is ***110*** kg.

For empty mass ***275*** kg and empty mass C.G. position ***554*** mm the minimum Cockpit load is 6***0***kg, the max. Cockpit load is ***100*** kg

Empty mass C.G. limits (Empty mass: lbs, C.G. Position: inches)

	Empty mass C.G. (in.)									
Empty mass	rear limit at min. cockpit load of (lbs.)							forward limit at max. cockpit load of (lbs.)		
(lbs)	132.3	143.3	154.3	165.3	176.4	187.4	198.4	220.5	231.5	242.5
529.1	24.931	25.675	26.416	27.153	27.913	28.674	29.489	23.540	24.225	24.928
531.3	24.893	25.634	26.371	27.106	27.863	28.620	29.392	23.483	24.165	24.865
533.5	24.855	25.593	26.327	27.059	27.813	28.567	29.336	23.427	24.106	24.803
535.7	24.818	25.552	26.284	27.012	27.763	28.514	29.28o	23.371	24.047	24.742
537.9	24.781	25.512	26.241	26.966	27.714	28.462	29.224	23.315	23.989	24.680
540.1	24.744	25.472	26.198	26.920	27.665	28.410	29.169	23.260	23.931	24.620
542.3	24.707	25.433	26.155	26.875	27.617	28.358	29.115	23.206	23.874	24.560
544.5	24.671	25.394	26.133	26.830	27.569	28.307	29.060	23.152	23.817	24.500
546.7	24.635	25.355	26.072	26.785	27.521	28.257	29.007	23.098	23.761	24.441
548.9	24.599	25.316	26.030	26.741	27.474	28.206	28.954	23.045	23.705	24.383
551.2	24.564	25.278	25.989	26.697	27.427	28.157	28.901	22.992	23.650	24.324
553.4	24.529	25.240	25.948	26.653	27.380	28.107	28.848	22.940	23.595	24.267
555.6	24.494	25.202	25.908	26.610	27.334	28.058	28.796	22.888	23.540	24.209
557.8	24.459	25.165	25.867	26.567	27.288	28.010	28.745	22.836	23.486	24.153
560.0	24.425	25.128	25.828	26.524	27.243	27.961	28.694	22.785	23.432	24.096
562.2	24.391	25.091	25.788	26.482	27.198	27.913	28.643	22.734	23.379	24.040
564.4	24.357	25.055	25.749	26.440	27.153	27.866	28.592	22.684	23.326	23.985
566.6	24.324	25.018	25.710	26.399	27.109	27.819	28.542	22.634	23.273	23.930
568.8	24.290	24.982	25.671	26.357	27.065	27.772	28.493	22.584	23.221	23.875
571.0	24.257	24.947	25.633	26.316	27.021	27.725	28.444	22.535	23.170	23.821
573.2	24.22	24.91	25.59	26.27	26.97	27.67	28.39	22.486	23.119	25.767
575.4	24.19	24.87	25.55	26.23	26.93	27.63	28.34	22.438	23.068	23.714
577.6	24.16	24.84	25.52	26.19	26.89	27.58	28.29	22.390	23.017	23.661
579.8	24.12	24.80	25.48	26.15	26.85	27.54	28.25	22.342	22.967	23.609
582.0	24.09	24.77	25.44	26.11	26.80	27.49	28.20	22.295	22.917	23.556
584.2	24.06	24.73	25.40	26.07	26.76	27.45	28.15	22.248	22.868	23.505
586.4	24.03	24.70	25.37	26.03	26.72	27.41	28.11	22.201	22.819	23.453
588.6	24.00	24.67	25.33	26.00	26.68	27.36	28.06	22.155	22.771	23.402
590.8	23.97	24.63	25.30	25.96	26.64	27.32	28.01	22.109	22.722	23.352
593.0	23.94	24.60	25.26	25.92	26.60	27.28	27.97	22.063	22.674	23.302
595.2	25.91	24.57	25.25	25.88	26.56	27.23	27.92	22.018	22.627	23.252
597.5	23.88	24.54	25.19	25.84	26.52	27.19	27.88	21.973	22.580	23.202
599.7	23.85	24.50	25.16	25.81	26.48	27.15	27.83	21.929	22.533	23.153
601.9	23.82	24.47	25.12	25.77	26.44	27.11	27.79	21.884	22.486	23.104
604.1	23.79	24.44	25.09	25.73	26.40	27.07	27.74	21.840	22.440	23.056

Empty mass C.G. limits (lbs, inches) continued

	Empty mass C.G. (in.)									
Empty mass	rear limit at min. cockpit load of (lbs.)							forward limit at max. cockpit load of (lbs.)		
(lbs)	132.3	143.3	154.3	165.3	176.4	187.4	198.4	220.5	231.5	242.5
606.3	23.76	24.41	25.05	25.70	26.36	27.02	27.70	21.797	22.394	23.008
608.5	23.73	24.38	25.02	25.66	26.32	26.98	27.66	21.753	22.349	22.960
610.7	23.70	24.34	24.99	25.63	26.28	26.94	27.61	21.710	22.304	22.913
612.9	23.67	24.31	24.95	25.59	26.25	26.90	27.57	21.668	22.259	22.866
615.1	23.64	24.28	24.92	25.55	26.21	26.86	27.53	21.625	22.215	22.819
617.3	23.61	24.25	24.89	25.52	26.17	26.82	27.49	21.583	22.170	22.773
619.5	23.59	24.22	24.85	25.48	26.13	26.78	27.45	21.542	22.126	22.727
621.7	23.56	24.19	24.82	25.45	26.10	26.74	27.40	21.500	22.683	22.681
623.9	23.53	24.16	24.79	25.42	26.06	26.71	27.36	21.459	22.040	22.636
626.1	23.50	24.13	24.76	25.38	26.02	26.67	27.32	21.418	21.997	22.591
628.3	23.48	24.10	24.73	25.35	25.99	26.63	27.28	21.377	21.954	22.546
630.5	23.45	24.07	24.70	25.31	25.95	26.59	27.24	21.337	21.912	22.502
632.7	23.42	24.04	24.66	25.28	25.92	26.55	27.20	21.297	21.870	22.457
634.9	23.40	24.02	24.63	25.25	25.88	26.51	27.16	21.257	21.828	22.414
637.1	23.37	23.99	24.60	25.21	25.85	26.48	27.12	21.218	21.786	22.370

Examples:
For empty mass ***606 lbs.*** and empty mass C.G. position ***26 in.*** the minimum Cockpit load is ***165.3 lbs.***, the max. Cockpit load is ***242.5 lbs.***.
For empty mass ***606 lbs.*** and empty mass C.G. position ***22 in.*** the minimum Cockpit load is ***132.3 lbs.***, the max. Cockpit load is ***220.5 lbs.***.

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3 Inspections

3.1 Regular inspections

3.1.1 Daily inspection and pre-flight check:

1. Clean and grease main ping and matching holes.
2. Clean and grease pins and eyes of automatic connectors.
3. Insure that drain holes are clean, see section 1.16 and water ballast tanks are tight.
4. Check static and pitot pressure ports, as well as TE probe for clogging, see section 1.14..
5. Check air pressure in wheel. (3-3.5 bar, 43-51 psi),
6. Check wheel brakes
7. Check tow release
8. Check emergency canopy release
9. Positive control check.
10. **Only LS3-a and LS3/17 aileron drive:** Check connection of ball snap joints after positive control check by trying to pull connectors of balls with a force of approx. 5 daN (10lbs.).
    You have to secure the connectors using safety pins or securing sleeves "white" pat No. 4R10-188 according to TB3049.
11. **Only LS3-17:** Cable to limit the wing flap setting to 0° for operation with 17 m wing span connected?

3.1.2 Daily post-flight check:

1. Remove insects and dust.
2. Remove any moisture in dive brake boxes using sponge.
3. Insure that water ballast system is empty.

3.1.3 Annual inspection:

1. Perform annual inspection with checklist see section 10.
2. Lubricate various parts according to see section 3.4.
3. Protect gel coat with car polish. If you use a polishing machine, be careful not to damage anti collision colour marking and registration signs.
4. Replace gap tape on aileron and elevator if old tape has shrunk. New tape (Tesaband 651) should be attached while aileron and elevator are fully deflected. (aileron upward, elevator downward).
5. If TB3054 has been carried out:
   Check **function of LS-latch (Röger hook) for canopy emergency release**
   Measure force required to lift canopy rear edge free from spring:
   Reference value 8 to 15 kg (17.6 to 33 lbs).
   If force required is considerably lower, the spring must be exchanged to ensure proper functioning of canopy jettison.
6. **L'Hotellier control quick connects:**
   a) Inspection according to L'Hotellier IM.10.01 see section 10.3.
   b) Inspection of the spring force of the sliding latch.

Warning: Don't replace or fix damaged or kinked springs. Exchange the complete quick connect in such case.

   c) Remove any grease from the sliding latch with Actone.
   d) If securing sleeves "white" pat No. 4R10-188 according to TB3049 are used the must be inspection for damage and sufficient clamping force.
7. **Only LS3-17:** Cable to limit the wing flap setting to 0° existing and in order?

3.2 Extraordinary inspections after heavy landings

Extraordinary inspections should be performed, depending on circumstances (rough landings, ground loops etc.)

1. Landing gear functioning and attachment.
2. Landing gear box for damage.
3. Wings, fuselage and tail for damage (Cracks, buckling, compression).
4. Wings flex number.
5. Control surfaces function.
6. Tail skid gluing.

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3.3 Inspection procedure for increase of service time

1. **General**

   The results of fatigue tests of wingspar sections have demonstrated that the service time of GFRP/CFRP gliders and motor gliders may be limited to 12000 hours, if for each individual glider (in addition to the obligatory annual inspections) the airworthiness is demonstrated according to a special multi-step inspection program particularly with regard to the service life.

2. **Dates**

   When the glider has reached a service time of 3000 hours, an inspection must be done in accordance with the inspection program mentioned under point 3. If the results of this inspection are positive or if any defects found have been duly repaired, the service time of the glider is extended by another 3000 hours to a total of 6000 hours (first step).

   The above inspection program must be repeated when the glider has reached a service time of 6000 hours. If the results of this inspection are positive or if any defects found have been duly repaired, the service time of the glider is extended to 9000 hours (second step).

   When the glider has reached a service time of 9000 h the above inspection program must be repeated. If the results of the inspection are still positive, or if any defects found have been duly repaired, the service time may be extended to a total of 10000 hours (third step).

   Proceed analogous when reaching 10000 and 11000 hours (4^{th} and 5^{th} step).

3. Ask the DG Flugzeugbau for the necessary inspection document.
   When you request the inspection document, the following data should be submitted: Model/Type, Registration, Serial Number and the operating hours at which the inspection will be performed. A charge will be made for the inspection document.

4. The inspection must only be done by a licensed repair station or inspector.

5. The results of the inspections have to be recorded in an inspection test report wherein comments are required for each inspection instruction. If the inspections are done outside the DG Flugzeugbau facilities, a copy of the records must be sent to DG Flugzeugbau for evaluation and information.

3.4 Lubrication Schedule

Location	Frequency	Lubricant
1. Pins and matching holes of automatic connectors, main pins and matching holes.	Before riiging	Water unsoluble bearing grease or Grease containing Molybdenum
2. Landing gear, all joints at rubber bearing	Once a year	Oil **Caution:** protect rubber parts against oil.
3. Bearings on flaperon **(LS3)** resp. aileron **(LS3-a and LS3-17)** automatic connectors	Once a year	Water insoluble bearing grease or Grease containing Molybdenum
4. Dive brakes drive (bevel gear)	Once a year	
5. FAG-7H safety harness multiple-point buckle	See Maintenance Instructions of Manufacturer	G 353 – Aero Shell Grease 17

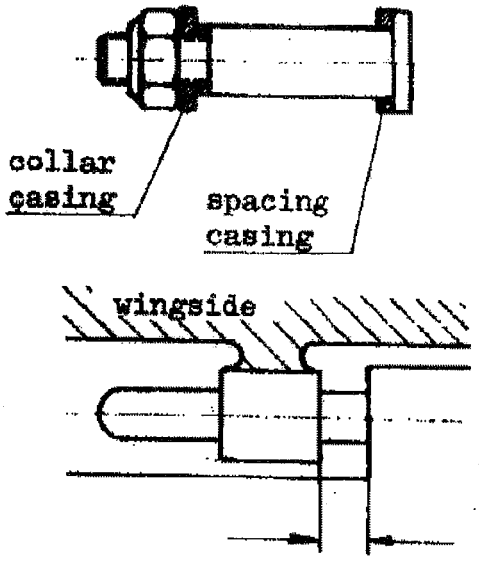
4 Working Instructions

4.1 Removal and installation of control surfaces

4.1.1 Flaperon LS3

4.1.1.1 Flaperon removal

1. Remove gap tape underneath wing.
2. Loosen nut (6 nm thread, LN9348 or DIN985-8 zn, width over flats 10 mm) and remove collar casing on innermost bearing.
3. Remove aileron from bearings towards middle of the wings.
   At least 3 persons are necessary, since mass balance is distributed over entire length.
4. Watch that you do not lose the spacing casing of the bearing closest to the fuselage. If casings are exchanged, minimum bearing distance should be checked as suggested below.



sideways bearing free play

Sideways minimum bearing free play in mm between aileron and bearing:

Bearing No.	Inside 1	2	3	4	5	6	7	8	9	Outside 10	11
Play mm	0	0.7	1.3	2.0	2.7	3.3	4.0	4.7	5.4	6.0	6.7
Play (in)	0	0.02	0.051	0.079	0.106	0.134	0.157	0.185	0.213	0.236	0.264

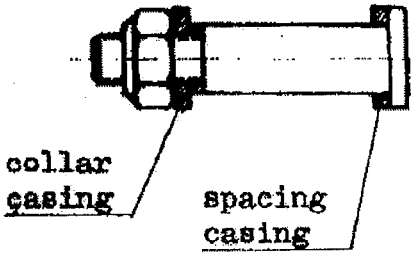
4.1.1.2 Flaperon installation

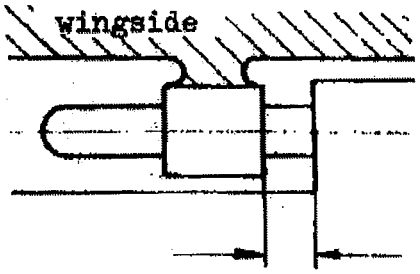
1. Match pins with bearings. Do not use force. Do not forget spacing casing on inside bearing.
2. Set up collar casing at inside bearing as shown above.
3. Tighten nut with maximum torque 1 mdaN. (7.233 ft lbs)
4. Check sideways min. bearing free play,
5. Tape gap on underside when flaperon is fully deflected upward with Tesaband 651.

4.1.2 Wing flaps LS3-a and LS3-17

4.1.2.1 Wing flap removal

1. Remove gap tape underneath wing.
2. Loosen nut (6 mm thread, LN 9348 or DIN985-8 zn, width over flats 10 mm) and remove collar casing on innermost bearing.
3. Remove internal sealing with flap fully deflected downwards.
4. Remove flap from bearings towards root rib of wing.
5. Watch that you do not loose the spacing casing of the bearing closest to the fuselage or washers at other hearings. If casings or washers are exchanged,, minimum bearing distance should be checked as suggested below.





sideways bearing free play

Sideways minimum bearing free play between aileron and bearing (wing flap and aileron)

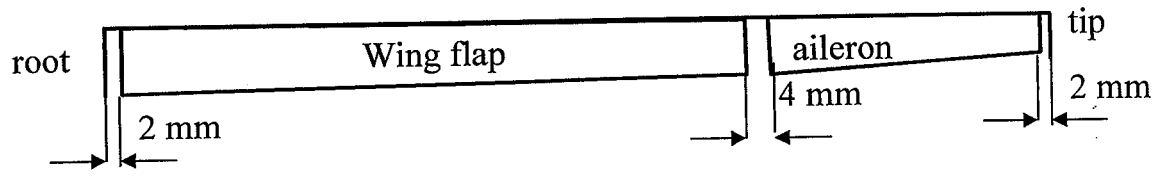
LS3-a

Bearing	ROOT wing flap								aileron				TIP
No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Play (mm)	0	0.7	1.3	2.0	2.7	3.1	3.3	4.0	0	4.7	5.4	6.0	6.7
Play (in)	0	0.028	0.051	0.079	0.106	o.122	0.134	0.157	0	0.185	0.213	0.236	0.264

LS3-17

Bearing	ROOT wing flap								aileron				TIP
No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Play (mm)	0	0.7	1.3	2.0	2.7	3.1	1.0	0.5	0	0.5	1	1.5	2
Play (in)	0	0.028	0.051	0.079	0.106	o.122	0.039	0.020	0	0.020	0.39	0.059	0.079

Minimum distances between control surfaces (wing flap and aileron)



4.1.2.2 Wing flap installation

1. Match pins with bearings. Do not use force. Do not forget spacing casing on inside bearing or wshers at other bearings.
2. Set up collar casing at inside bearing as shown above.
3. Tighten nut with maximum torque 1 mdaN. (7.233 ft lbs).
4. Check sideways min. bearing free play and distance to aileron,
5. Fix internal sealing see section 4.2.
6. Tape gap on underside when flap is fully deflected upward with Tesaband 651.

4.1.3 Ailerons LS3-a and LS3-17

4.1.3.1 Aileron removal

(only possible after removal of wing flaps)

1. Remove gap tape underneath wing.
2. Loosen nut (6 mm thread, LN 9348 or DIN985-8 zn, width over flats 10 mm) at bearing NO. 9 and remove washers. Watch sequence and location of washers..
3. Loosen nut at aileron drive, pull out bolt and watch location of washers.
4. Remove internal sealing with aileron fully deflected downwards.
5. Remove aileron from bearings towards root rib of wing.

4.1.3.2 Aileron installation

1. Match pins with bearings. Do not use force. Do not forget spacing casing or wshers at bearing No. 9.
2. Tighten nut with maximum torque 1 mdaN. (7.233 ft lbs).
3. Fit bolt to aileron drive, watch washers and tighten nut with maximum torque 1 mdaN. (7.233 ft lbs).
4. Check sideways min. bearing free play and distance to wing flap,
5. Fix internal sealing see section 4.2.
6. Tape gap on underside when aileron is fully deflected upward with Tesaband 651.

4.1.4 Elevator all variants

4.1.4.1 Elevator Disassembly:

1. Remove gap tape on upper side.
2. Loosen nut on left inside bearing (5 mm thread, LN9348 or DIN985-8 zn, width Over flats 8 mm). Remove first the small washer and then the large one.
3. **LS3:** Remove elevator to the right.
   LS3-a and LS3-17: Remove elevator to the left.

4.1.4.2 Elevator Installation:

1. Match bolts to bearings. Do not use force.
2. Insert large washer, then small washer on left inside bearing. Tighten nut with maximum torque of 1 mkg.
3. Tape gap on upper side with elevator fully deflected downward.

4.1.5 Rudder all variants

4.1.5.1 Rudder Disassembly:

1. Disconnect rudder cables. Watch spacing casings.
2. Loosen nut at lower bearing (6 mm thread, LN9348 or DIN985-8 zn, width over flats 10 mm). Remove small washer, then large washer.
3. Mark rear fin trailing edge at both sides of upper end of the rudder using a soft pencil, rudder in neutral position.
4. Lift rudder upwards from bearings.

4.1.5.2 Rudder Installation:

1. Set rudder on bearings. If both pencil markings are not visible at the same time when in neutral position, the upper bearing pin sits in front of its needle roller bearing.
2. Insert large washer, then small washer on lower bearing. Tighten nut with maximum torque of 1 mdaN (7.233 ft lbs). After assembly the rudder should have slight axial free play. Maximum axial free play 1 mm.
3. Connect rudder cables. Do not forget to insert spacing casings.

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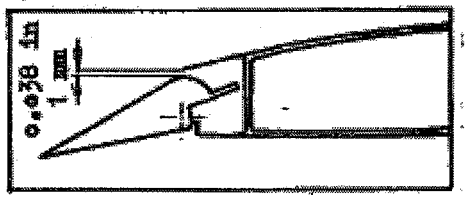
4.2 Installation of internal sealings for ailerons and flaps (LS3-a and LS3/17)

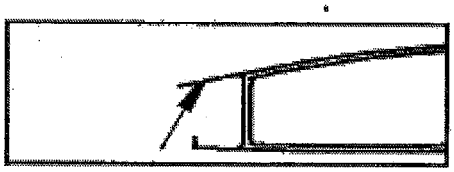
Introduced by TB 3030 LS3-a and 3031 LS3-17.

The following items are necessary:
2 supports for horizontal wing position
2 supports for vertical wing position
Plain surface of 3.8 m x 0.3 m (12.5 ft. x 1.0 ft.)

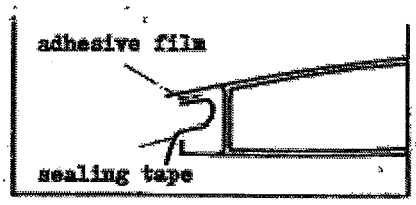
1. Gap between wing and control surface upper side must be at least 1 mm (0.038 in.) wide in all positions. Enlarge smaller gap on wingside only using sanding paper grade 60 glued to a 0.5 mm (0.020 in.) thick sheet metal.



2. Mark rear edge o f wing on upper side of control surface using a soft pencil, when fully deflected downwards. Remove control surface with 2 persons.

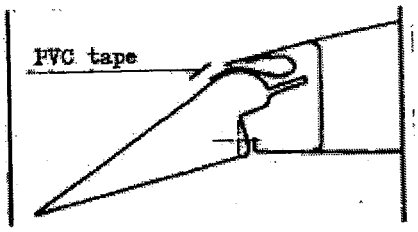


3. Roughen gluing area on inside upper rear wing edge using sanding paper grade 60. Round sharp edge slightly (sanding paper grade 180) and blow off dust.
4. Clean gluing area at inner trailing edge and on sealing tape with benzene.
5. Place sealing tape on table and apply adhesive film with edge flug to sealing tape edge.
6. Mark rear gluing edge inside wing trailing edge as follows: 4 mm (0.157 in.) forward of the trailing edge from tip to 1 m (3.28 in.) outboard of root rib, from there increase distance continuously to 10 mm (0.394 in.) at root rib.
7. Pull masking tape off from prepared sealing tape and glue to inside wing trailing edge along marked line. Press gluing firmly for short time.



8. Clean leading edge of control surface behind marked trailing edge of wing with acetone and also the second side of the sealing tape.

9. Apply adhesive film to leading edge of control surface flush bind marking line.



10. Install control surface to wing and displace fully downward. Pull sealing tape out of gap, pull masking tape off and lay sealing tape on adhesive film avoiding bracing or lateral displacement. Press sealing to adhesive film firmly using a roller.
11. Cut surplus sealing tape along traiing edge of adhesive film using a sharp knife and a straight edge.
12. Mask trailing edge of sealing tape with PVC tape to avoid warping.

4.3 Nose Hook System removal and installation (Option TB3052)

Tools: 3/4" drive ratchet, 8 and 10 mm sockets, 3 and 4 mm hex head driver sockets, 10 mm ring spanner. 12 mm open end spanner.

General: Note length of bolts and positioning of washers for all assembly positions. Keep fixing bolts, 5 spacers and lever extension with plane during hook overhaul.

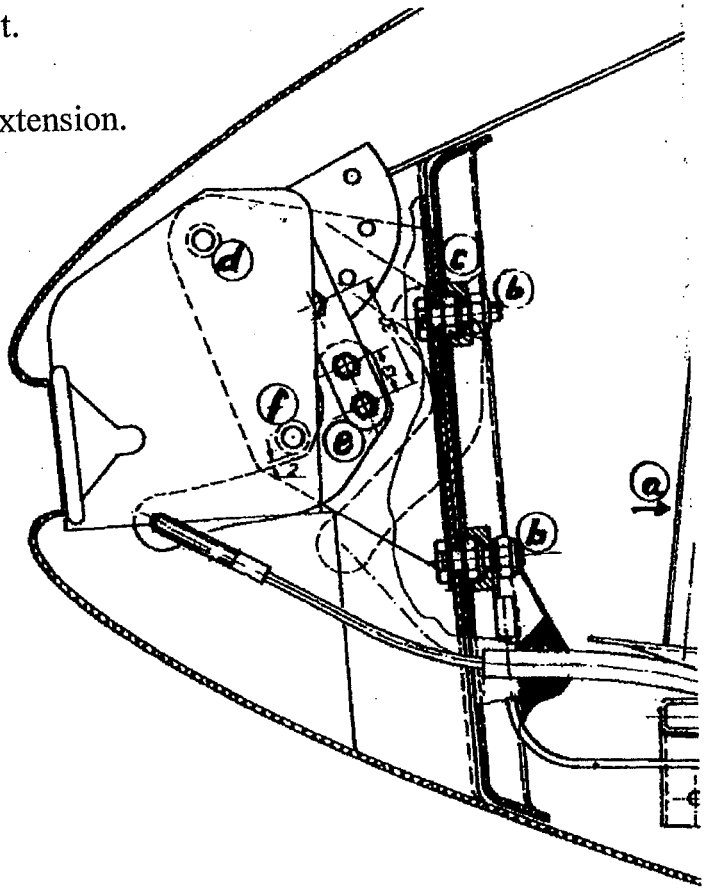
Removal

1. Take canopy off from fuselage with a helper after pulling emergency canopy release.
2. Disassemble seat.
3. Under seat, disconnect C.G. release cable from pulley, watch for spacer.
4. Pull pedals to rearmost position.
5. Disconnect trim mass holder from pedal guide at >a<.
6. Disconnect nuts >b< at forward bulkhead cover and remove hat shaped washers. Remove nuts >c< from hook bracket.
7. Swivel cover backward, pull hook including brackets backward and around pedal holder.
8. Disassemble nose hook from brackets at >d< and >f<, watch for 4 spacers between nose hook body and brackets and for 1 spacer inside nose hook body at position >f<
9. Disassemble drive extension with cable from drive lever at >e<

Installation of nose hook in reverse order, watch out especially for the following:

1. Insert spacer at position >f< inside hook body before assembly of lever extension.
2. When assembling nose hook into bracket, guide spacers into position using 12 mm open end spanner.
3. After assembly at >c< and connecting C.G. hook cable at pulley (spacer!) - check proper function of both hooks.
4. For proper overcenter of hook system, at least 10 mm <0.4 in> of free cable travel must be available at cockpit T-shaped handle in both landing gear positions, extended and retracted.
5. Connect earth cable from control stick support to one bolt before assembly of cover.
6. Re-install trim mass holder at forward pedal system support.
7. Before Installation of seat, check functions of pedal system and locking of pedal adjustment
   Check for non-existence of foreign matter.

a) Trim mass holder at forward pedal support.
b) Nuts holding cover on bulkhead.
c) Nuts holding nose hook unit.
d) Upper hook fixing bolt.
e) Connection of drive lever extension.
f) Lower hook fixing bolt.



5 Control surfaces

5.1 Control surface deflection limits

5.1.1 Control surface deflection limits LS3

Aileron: Flaps fully deflected downward 10°:
up 55 ± 5 mm (2.17 ± 0.2 in), down 40 ± 5 mm (1.57 ± 0.2 in)
measure at Radius 278 mm (10.94 in) against Reference point on fuselage
Flaps fully deflected upwards -7°:
only up 113±5 mm (4.45 ± 0.2 in)
measure at Radius 278 mm (10.94 in) against Reference point on fuselage

Flaps: down 0 mm (0 in.) +10° Position
up 48 mm (1.89 in)= 0° setting
up 82±5 mm (3.23±0.2 in) = -7° setting
measure at Radius 278 mm (10.94 in) against Reference point on fuselage

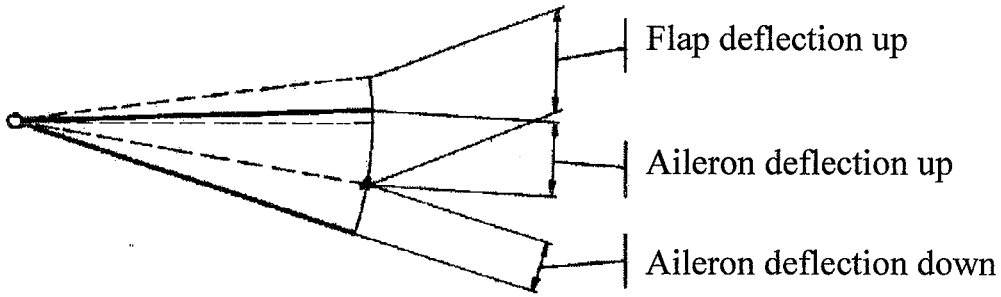
Elevator: Up 56 ± 5 mm (2.20 ± 0.2 in)
Down 56 ± 5 mm (2.20 ± 0.2 in) Radius 145 mm (5.71 in),
Reference point on right side of rudder

Rudder: To both sides 185±10 mm (7.28 ± 0.39), radius 362 mm (14.25 in).

Dive Brake: Up 169 ± 3 mm (6.65 ± 0.12 in) at inner lever.

Measurement technique of aileron and flap deflection

1. Flaps should be fully deflected down, +10° position.
2. Measure aileron deflection up and down, from fuselage reference point.
3. Flaps Full up, -7° position.
4. Measure flap deflection with aileron in middle position using reference mark on fuselage.



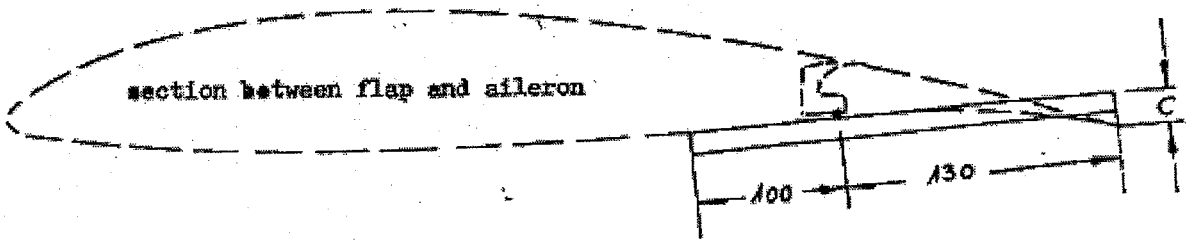
---------- Flap deflections
———————— Aileron deflections
▲ Fuselage reference point

5.1.2 Control surface deflection limits LS3-a and LS3-17:

Elevator:	up -22° ± 2° = 350 mm ± 5 mm Radius: 148 mm down: +22° ± 2° = 245 mm ± 5 mm Reference point: 300mm below centre of trailing edge at 0° displacement at fin trailing edge. Mark reference point at the fin trailing edge, if not existent.
Rudderr:	to both sides: 28° ± 2° = 150 ± 10 mm, Radius: 310 mm
Wing flap + Aileron:	Radius: 130 mm Reference line: lower side of wing section between flap and aileron, 100 mm (3.94 in.) in front of hinge line, see sketch. Measure at right angle to feference line. Deflectionss see table below

0°-position at reference line (c): + 9 ± 2 mm (down)

Wing flap handle position	Wing flap position	Aileron position	Aileron deflections
20°	17°±3° down	7°+3° down	
10°	7°±3° down	7°±3° down	16°±3° down -13°±3° up
0°	0°±1°	0°±1°	
-7°	-5°±3° nach oben	-5°±3° up	-17°±3° up



5.2 Mass balance and free play of control surfaces

5.2.1 General

Mass balance and play should be within given limits for safety against flutter.

Measuring technique:
Load at trailing edge:
All surfaces except flaperon LS3: Remove flight control surface and suspend it at 2 of its bearings without any tension or friction. Load at trailing edge should be measured at level position of reference line with a spring balance in vertical direction.
Flaperon LS3: See other surfaces but use 4 of the bearings.

Free play should be measured at reference radius with control stick fixed to zero position.

5.2.2 LS3:

Surface	Radius	Horizontal ref. line	Load at trailing edge	Maximum free play
Surface	278 mm 10.94 in	lower side	0.50 - 0.90 kg 1.10 - 1.98 lbs.	5.0 mm 0.20 in.
Elevator with mass balance	145 mm 5.71 in	upper side	0,35 - 0,55 kg 0.77 – 1.21 lbs.	3 mm 0.12 in.
Rudder	362 mm 14.25 in	center line	± 0.10 kg ± 0.22 lbs.	not applicable

Measuring technique see section 5.2.1.

5.2.3 LS3-a

Surface	Radius	Horizontal ref. line	Load at trailing edge	Mass of surface	Max. free play
wing flaps	170 mm 6.69 in.	lower side	0,74 bis 0,98 kg 1.63 -2.16 lbs.	4,3 - 5,5 kg 9.48 – 12.13 lbs.	3,0 mm 0.12 in.
ailerons*	130 mm 5.12 in.	lower side	0,490 bis 0,65 kg 1.08 – 1.43 lbs..	2,3 - 3,1kg 5.07 – 6.83 lbs.	2,6 mm 0.10 in.
ailerons**	130 mm 5.12 in.	lower side	0,195 bis 0,26 kg 0.43 – 0.57 lbs	3,42 - 4,6 kg 7.54 – 10.14 lbs.	2,6 mm 0.10 in.
Elevator* with mass balance	145 mm 5.71 in.	center line	0,23 bis 0,31 kg 0.51 – 0.68 lbs.	2,6 – 3,5kg 5.73 – 7.72 lbs.	3,0 mm 0.12 in.
Elevator** no mass balance	145 mm 5.71 in.	center line	0,33 bis 0,44 kg 0.73 – 0.97 lbs.	1,41 - 1,9 kg 3.11 – 4.19 lbs.	3,0 mm 0.12 in.
Rudder	310 mm 12.2 in.	center line	± 0,04 kg ± 0.09 lbs.	3,1 - 4,1 kg 6.83 – 9.04 lbs.	not applicable

*initial LS3-a

** with aileron mass balance according to TB3028 (optional) for better aileron handling

*** LS3-a with elevator control of LS3/17 see section 1.3.1 and 1.3.2 (mass balance is by balance masses installed at the elevator pushrod)

Measuring technique see section 5.2.1.

5.2.4 LS3-17

Surface	Radius	Horizontal ref. line	Load at trailing edge	Mass of surface	Max. free play
wing flaps	170 mm 6.69 in.	lower side	0,74 bis 0,98 kg 1.63 -2.16 lbs.	4,3 - 5,5 kg 9.48 – 12.13 lbs.	3,0 mm 0.12 in.
ailerons	130 mm 5.12 in.	lower side	0,195 bis 0,26 kg 0.43 – 0.57 lbs.	3,42 - 4,6 kg 7.54 – 10.14 lbs.	2,6 mm 0.10 in.
Elevator no mass balance	145 mm 5.71 in.	center line	0,33 bis 0,44 kg 0.73 – 0.97 lbs.	1,41 - 1,9 kg 3.11 – 4.19 lbs.	3,0 mm 0.12 in.
Rudder	310 mm 12.2 in.	center line	± 0,04 kg ± 0.09 lbs.	3,1 - 4,1 kg 6.83 – 9.04 lbs.	not applicable

Additional elevator mass balance is by balance masses installed at the elevator pushrod in the fin.

Measuring technique see section 5.2.1.

6 Placards

6.1 Placards LS3

LS3 Checklist
This sailplane must be operated in compliance with operating limitations as stated in the form of markings, placards and flight manual.
1. Lock main pins.
2. Lock horizontal tail.
3. Connect chute static line.
4. Lock divebrakes.
5. Flap positioning:
   Winch tow +1o° full down
   Aero tow around o°
6. Test controls.
7. Lock canopy.
8. Check release.

MINIMUM COCKPIT LOAD ...kg

under Instrument Cover

Airspeed Limits (I.A.S.)		LS3 Serial No.		
Never exceed	(VNE)	270 km/h	168 mph	146 kts
In rough air	(VB)	190 km/h	118 mph	103 kts
Maneuvering	(VA)	190 km/h	118 mph	103 kts
Flaps down	(VFE)	190 km/h	118 mph	103 kts
Aero tow	(VT)	190 km/h	118 mph	103 kts
Winch tow	(VW)	130 km/h	81 mph	70 kts
Dive Brakes		270 km/h	168 mph	146 kts
Landing Gear	(VL)	270 km/h	168 mph	146 kts

Maximum weight 472 kg (1041 lbs) including water ballast.

No aerobatic maneuvers approved.

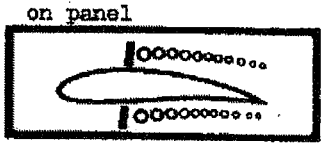

Gear down


Gear up


Towrope release on panel


Trim nose up

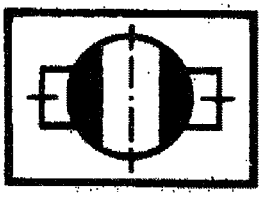

Trim nose down

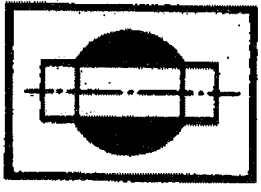

Divebrake control

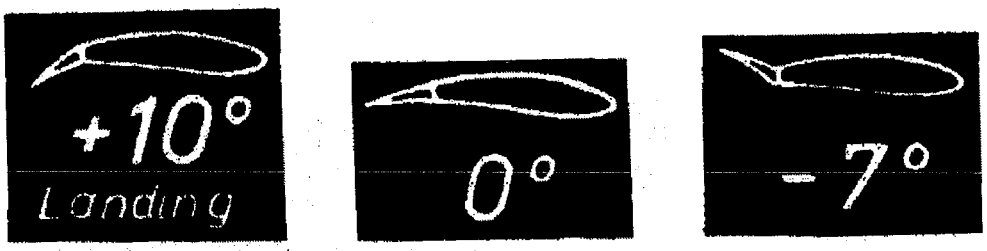

Canopy emergency release on panel


Canopy release on rim

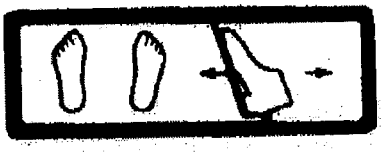

Air vent on panel


Water ballast valve closed


Water ballast valve open



Flap position on left canopy rim



Pedal adjustment on panel

Rolladen Schneider Sailplane Division	
Type	LS3
Serial No.	
FAA TC	
REG.No.	

Type placard at main bulkhead

Electrical switch positions

Issued: December 2009

6.2 Placards LS3-a without TB 3016

LS3-a Checklist
This sailplane must be operated in compliance with operating limitations as stated in the form of markings, placards and flight manual.
1. Lock main pins.
2. Lock horizontal tail.
3. Connect ailerons.
4. Test controls.
5. Fasten seat belt harness.
6. Connect chute static line.
7. Lock dive brakes.
8. Flap positioning during take off: 0° .
9. Lock canopy.
10. Check release.

MINIMUM COCKPIT LOAD ... kg

under Instrument cover

Max.Flying Altitude
20000 ft

Near Altimeter, when range 20000 ft

Airspeed Limits (I.A.S.) LS3 Serial No.				
Never exceed	(VNE)	270 km/h	146 kts	168 mph
In rough air	(VB)	190 km/h	103 kts	118 mph
Maneuvering	(VA)	190 km/h	103 kts	118 mph
Flaps down 20°-10°	(VFE)	160 km/h	86 kts	99 mph
10°-0°		190 km/h	103 kts	118 mph
Aero tow	(VT)	190 km/h	103 kts	118 mph
Winch tow	(VW)	130 km/h	70 kts	81 mph
Dive brakes		270 km/h	146 kts	168 mph
Landing gear	(VL)	270 km/h	146 kts	168 mph

Maximum weight 472 kg (1041 lbs) including water ballast.

No aerobatic maneuvers approved.

VNE up to
9800 ft

19700 ft

32800 ft

Airspeed Indicator Placards

ON OFF

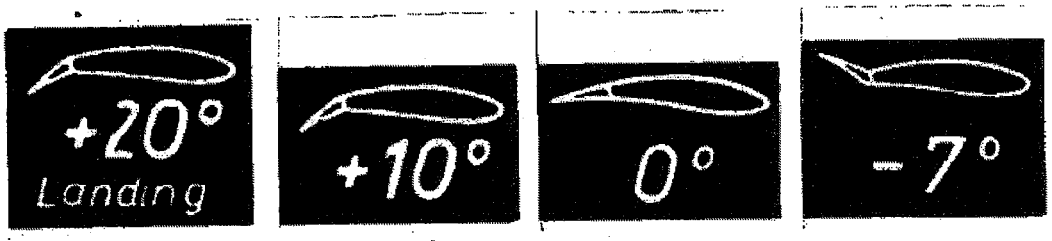
Electrical switch positions

Rolladen Schneider Sailplane Division
Type LS3-a
Serial No. _____
FAA TC _____
Reg.No. _____

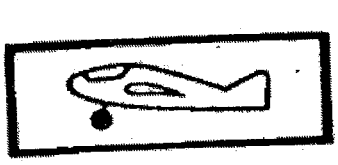
Type placard at main bulkhead

Maximum Baggage Weight 5 kg or 11 lbs
(Soft items only)

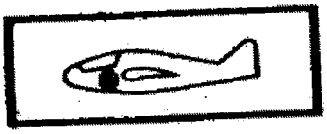
Baggage compartment placard



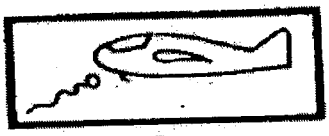
Flap position on left canopy rim



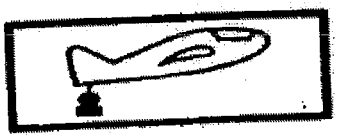
Gear down



Gear up

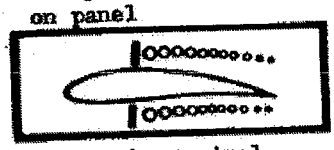


Towrope release on panel

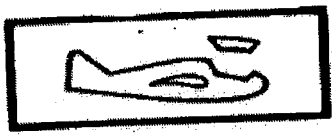


Trim nose up

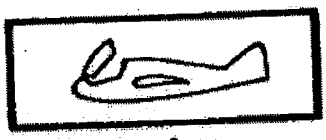
Trim nose down



Divebrake control

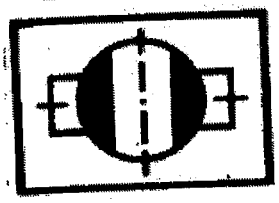


Canopy emergency release on panel

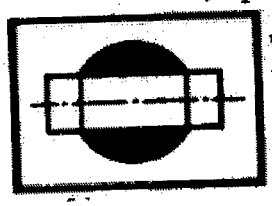


Canopy release on rim

Air vent on panel



Water ballast valve closed



Water ballast valve open

Pedal adjustment on panel

Issued: December 2009

6.3 Placards LS3-a with TB 3016

LS3-a Checklist
This sailplane must be operated in compliance with operating limitations as stated in the form of markings, placards and flight manual.
1. Lock main pins.
2. Lock horizontal tail.
3. Connect ailerons.
4. Test controls.
5. Fasten seat belt harness.
6. Connect chute static line.
7. Lock dive brakes.
8. Flap positioning during take off: 0° .
9. Lock canopy.
10. Check release.

MINIMUM COCKPIT LOAD ... kg

under Instrument cover

Max. Flying Altitude 20000 ft

Near Altimeter, when range 20000 ft

Airspeed Limits (I.A.S.)		LS3 Serial No.		
Never exceed	(VNE)	270 km/h	146 kts	168 mph
In rough air	(VB)	190 km/h	103 kts	118 mph
Maneuvering	(VA)	190 km/h	103 kts	118 mph
Flaps down 20°-10°	(VFE)	160 km/h	86 kts	99 mph
10°-0°		190 km/h	103 kts	118 mph
Aero tow	(VT)	190 km/h	103 kts	118 mph
Winch tow	(VW)	130 km/h	70 kts	81 mph
Dive brakes		270 km/h	146 kts	168 mph
Landing gear	(VL)	270 km/h	146 kts	168 mph

Maximum weight 472 kg (1041 lbs) including water ballast.

No aerobatic maneuvers approved.

VNE up to 9800 ft

19700 ft

32800 ft

Airspeed Indicator Placards

ON OFF

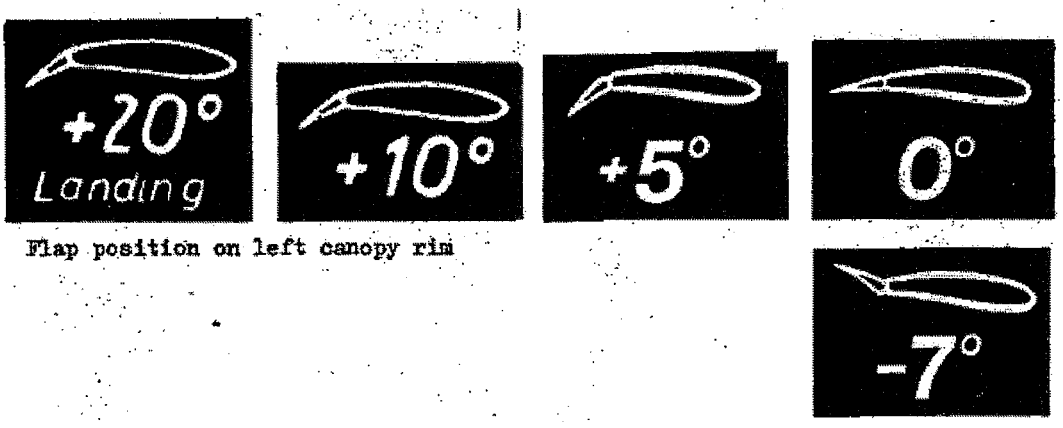
Electrical switch positions

Rollladen Schneider Sailplane Division
Type LS3-a
Serial No. _____
FAA TC _____
Reg.No. _____

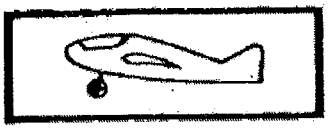
Type placard at main bulkhead

Maximum Baggage Weight 5 kg or 11 lbs (Soft items only)

Baggage compartment placard

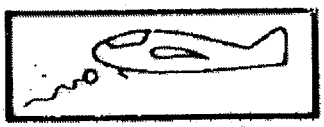


Flap position on left canopy rim

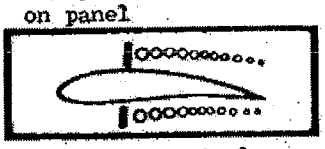


Gear down

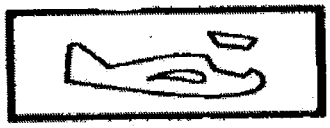
Gear up



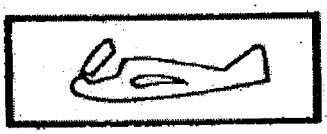
Towrope release
on panel



Divebrake control

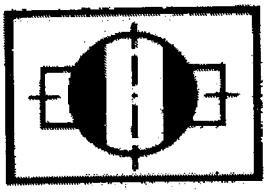


Canopy emergency
release on panel

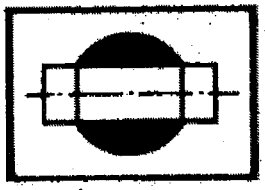


Canopy release
on rim

Air vent
on panel

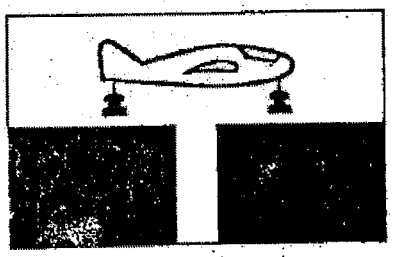


Water ballast valve
closed



Water ballast valve
open

Pedal adjustment
on panel



Trim setting
Indicator

6.4 Placards LS3-17

LS3-a Checklist
This sailplane must be operated in compliance with operating limitations as stated in the form of markings, placards and flight manual.
1. Lock main pins.
2. Lock horizontal tail.
3. Connect ailerons.
4. Test controls.
5. Fasten seat belt harness.
6. Connect chute static line.
7. Lock dive brakes.
8. Flap positioning during take off: 0° .
9. Lock canopy.
10. Check release.

MINIMUM COCKPIT LOAD ... kg

under Instrument cover

Max.Flying Altitude 20000 ft

Near Altimeter, when range 20000 ft

VNE up to 9800 ft

19700 ft

32800 ft

ON OFF

Electrical switch positions

Airspeed Indicator Placards

Rolladen Schneider Flugzeugbau GmbH

Type: LS3-17 Serial No.

		km/h	MPH	kts
Never exceed	(VNE)	250	155	135
In rough air	(VB)	160	99	86
Maneuvering	(VA)	160	99	86
Flaps down 20°	(VFE)	160	99	86
Aero tow	(VT)	160	99	86
Winch tow	(VW)	130	81	70
Dive Brakes		250	155	135
Landing Gear	(VL)	250	155	135
Dive Brakes 20° to 10°		160	99	86
10° to 0°		160	99	86
0°		250	155	135

Maximum Weight 370 kg (816 lbs).

No aerobatic maneuvers approved.

Weight Limitations

		kg	lbs
Pilot Weight incl. Parachute	MAX.		
	MIN.		

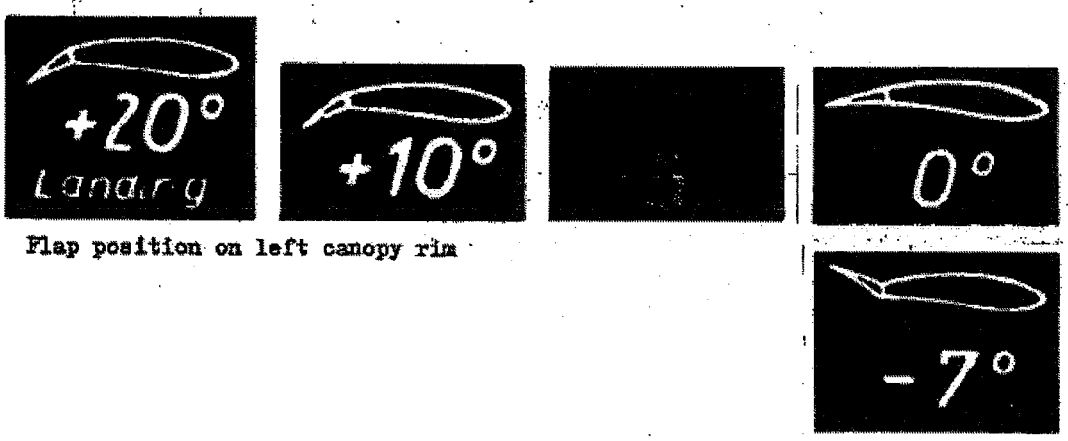
Lighter Pilots must compensate lack of weight as suggested in Flight Manual.

Rolladen Schneider Flugzeugbau GmbH
Type LS3- 17
Serial No. _____
FAA TC _____ Made in
Reg.No. _____ West Germany

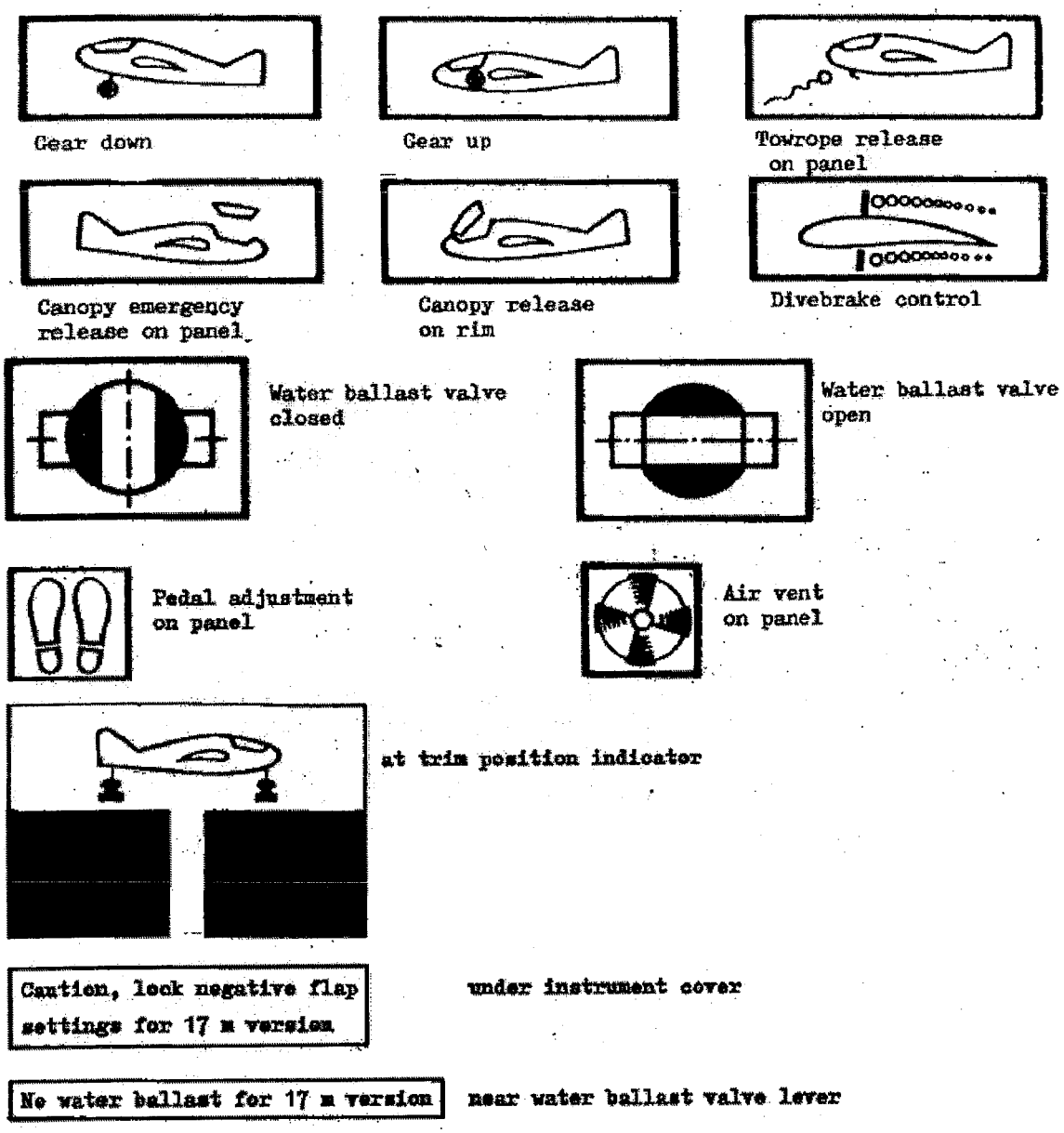
Type placard at main bulkhead

Maximum Baggage Weight 5 kg or 11 lbs (Soft items only)

Baggage compartment placard



Flap position on left canopy rim



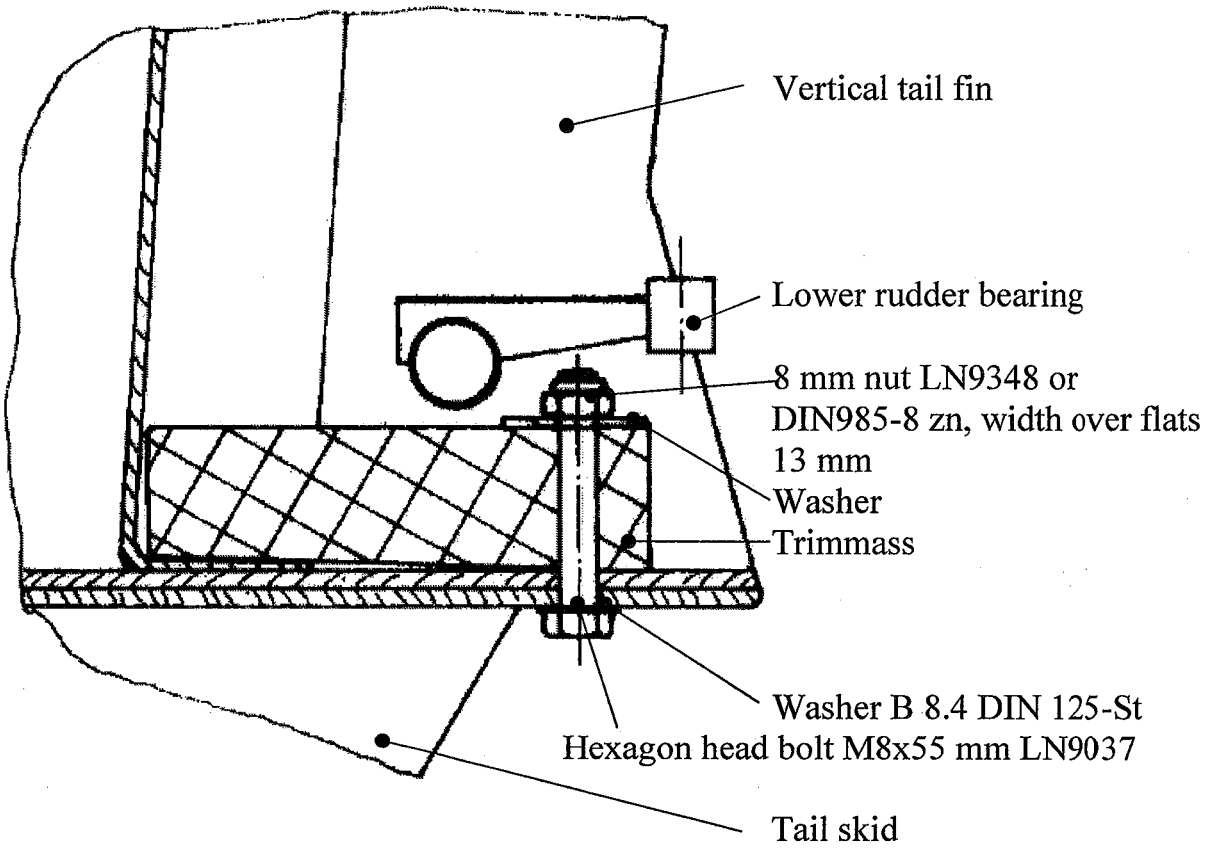
6.5 Placards LS3-a and LS3-17 with TB 3021

See section 6.3 but instead of placard "Trim Setting Indicator" the placards "Trim nose up – Trim nose down" see section 6.1 are used.

7 Ballast and Equipment

7.1 Installation of compensating mass in tail

After installation of trim mass in tail the empty mass C.G. should be determined by weighing and a new weighing report must be written, see section 2,.

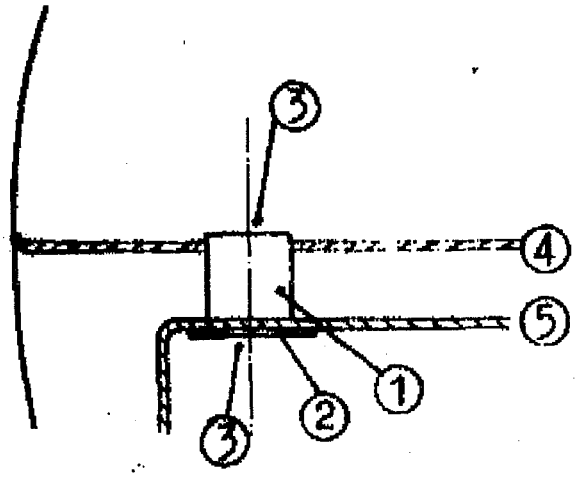


7.2 Fitting of equipment in the baggage compartment

Equipment must be fitted to landing gear box using threaded spacing casings, three of which are necessary per unit.
See Sketch. The baggage compartment cover has to be cut out to avoid casings.

(1) Spacing casing diameter 18-20 mm (0.7-0.8 in), length 15 mm (0.6 in)
(2) Washer B6.4 DIN 9021-St
(3) Hexagon headed bolt M6x20 LN9037 oder DIN933-8.8 zn, adjust length to fit.
(4) Baggage compartment cover.
(5) Landing gear box.

Only LS3: Winter barographs may be fixed in the appropriate mold in the cover using spring.



8 Instrumentation and equipment

8.1 Minimum Equipment

Note: The min. equipment and the ASI colour markings are not given in the flight manuals of all variants. For this reason the information is given here.

1. Airspeed Indicator Scale from 50 to 300 km/h (27-162 kts, 31-186 mph)

Colour markings **LS3**:

				and placard saying VNE up to
red radial	270 km/h	146 kts	168 mph	*9800 ft*
red radial	227 km/h	123 kts	141 mph	*19700 ft*
red radial	180 km/h	97 kts	112 mph	*32800 ft*
yellow arc	190-270 km/h	103-146 kts	118-168 mph	
green arc	85-190 km/h	46-103 kts	53-118 mph	
white arc	85-190 km/h	46-103 kts	53-118 mph	
yellow triangle	90 km/h	49 kts	56 mph	

Colour markings **LS3-a**:

				and placard saying VNE up to
red radial	270 km/h	146 kts	168 mph	*9800 ft*
red radial	219 km/h	118 kts	136 mph	*19700 ft*
red radial	173 km/h	93 kts	107 mph	*32800 ft*
yellow arc	190-270 km/h	103-146 kts	118-168 mph	
green arc	90-190 km/h	49-103 kts	56-118 mph	
white arc	85-160 km/h	46- 86 kts	53- 99 mph	
yellow triangle	90 km/h	49 kts	56 mph	

Colour markings **LS3-17**:

				and placard saying VNE up to
red radial	250 km/h	135 kts	155 mph	*6500ft*
red radial	234 km/h	126 kts	145 mph	*9800 ft*
red radial	203 km/h	110 kts	126 mph	*19700 ft*
red radial	162 km/h	87 kts	101 mph	*32800 ft*
yellow arc	160-250 km/h	86-135 kts	99-155 mph	
green arc	85-160 km/h	46- 86 kts	53- 99 mph	
white arc	85-160 km/h	46- 86 kts	53- 99 mph	
yellow triangle	90 km/h	49 kts	56 mph	

2. Altimeter in m or ft.
3. Four piece seat belt harness.
4. Seat cushion or parachute in compressed form should not be thinner than 80-100 mm (3-4 in).
5. Checklist, Type placard, Weight and Balance plan and operating placards, Flight Manual.
6. VHF radio ready for use

In addition for cloud flying according to national requirements:

1. Turn and Bank Indicator or artificial horizon.
2. Magnetic compass, compensated in the aircraft.
3. Variometer.

Note: The required minimum equipment must be certified for use in sailplanes.

8.2 Instruments- and Equipment List (Master Equipment List)

Maximum mass of all Instrument Panel Installations max. 6.7 kg <14.8 lbs>.

8.2.1 Airspeed Indicator

LS3

Manufacturer	Type	TCDS No.
Winter	6FMS-4 (Diameter 80mm) 0-300 km/h Ident.No.. LS-3-1 0-186 mph Ident.No.. LS-3M-1 0-160 kts Ident.No.. LS-3K-1	TS 10.210/15
Winter	7FMS-4 (Diameter 58mm) 0-300 km/h Ident.No.. LS-3-1 0-186 mph Ident.No.. LS-3M-1 0-160 kts Ident.No.. LS-3K-1	TS 10.210/19

LS3-a

Manufacturer	Type	TCDS No.
Winter	6FMS-4 (Diameter 80mm) 0-300 km/h Ident.No.. LS-3A-1 0-186 mph Ident.No.. LS-3AM-1 0-160 kts Ident.No.. LS-3AK-1	TS 10.210/15
Winter	7FMS-4 (Diameter 58mm) 0-300 km/h Ident.No.. LS-3A-1 0-186 mph Ident.No.. LS-3AM-1 0-160 kts Ident.No.. LS-3AK-1	TS 10.210/19

LS3-17

Manufacturer	Type	TCDS No.
Winter	6FMS-4 (Diameter 80mm) 0-300 km/h Ident.No.. LS-3-17-1 0-186 mph Ident.No.. LS-3-17M-1 0-160 kts Ident.No.. LS-3-17K-1	TS 10.210/15
Winter	7FMS-4 (Diameter 58mm) 0-300 km/h Ident.No.. LS-3-17-1 0-186 mph Ident.No.. LS-3-17M-1 0-160 kts Ident.No.. LS-3-17K-1	TS 10.210/19

or other Airspeed indicators approved according to TSO, JTSO or ETSO for use in aircraft or similar FAA approved airspeed indicators to meet TSO C2 reading to 300 km/h <160 Kt., 180 mph> may be used. Maximum instrument error ±2%. Colour marking must be according to section 8.1.

8.2.2 Altimeter

Manufacturer	Type	TCDS No.
Winter	4 FGH 10 (Diameter 80mm) 1000-10000m Ident.No.. 4100 3000-30000ft Ident.No.. 4330	TS 10.220/46
Winter	4 FGH 20 (Diameter 58mm) 1000-10000m Ident.No. 4220	TS 10.220/47
Winter	4 FGH 40 (Diameter 58mm) 1000-20000ft Ident.No.. 4550	TS 10.220/48

or other Altimeters approved according to TSO, JTSO or ETSO for use in aircraft; one turn of dial max. 1000 m or 3000 ft. A similar FAA approved altimeter to meet TSO C10 with a range of approximately 33000 ft and a mercury or millibar or hektopascal subscale may be used. When an altimeter of up to 20000 ft only is being used, a placard must be near the altimeter stating: Maximum flying altitude 20000 ft. See also Flight Manual section 2-8.

8.2.3 Seat Belt Harness (with multiple point buckles)

Manufacturer	Type	TCDS No.
Schroth	4-01-0104 (Lap belt and shoulder strap)	40.073/11
Schroth	4-01-1A52	
Gadringer	Lap belt 4502 with Shoulder strap 2300	40.070/32 40.071/05
Gadringer	BAGU 5402 or BAGU 5302with Shoulder strap 2700	40.070/32 40.071/05
Autoflug	BAGU FAG-12 D SCHUGU FAG-12/ H	40.070/47 40.071/25
Autoflug	BAGU FAG-7 D SCHUGU FAG-7 H	40.070/30 40.071/21

Note: For replacement lap belts without sewed in brackets may be used with the old bracket detached from the old lap belts.

8.2.4 Compass

Manufacturer	Type	TCDS No.
Ludolph	FK 16, FK 5, FK 10	10.410/3
Airpath	C 2300	TS 10.220/47
Airpath	C 2400 P	
PZL	BS1, KJ-13A	FD 19/77
Bohli	46 MFK 1	Not approved, only as additional system

8.2.5 UHF – Transmitter and Receiver

Manufacturer	Type	TCDS No.
Dittel	FSG-40 S	10.911/45
	FSG-50	10.911/71
	FSG-60 M	10.911/72
	FSG-70,71 M	10.911/81
	FSG-90	10.911/98JTSO
	FSG 2T	LBA.0.10.911/103JTSO
Becker	AR 3201-(1)	10.911/76
	AR 2008/25 (A)	10.911/48
	AR 4201	JTSO-2C37 D, ED-23A
Filser / Funkwerk	ATR 720 A	10.911/74
	ATR 720 C	10.911/83
	ATR 600	O.10.911/106JTSO
	ATR 500	LBA.0.10.911/113JTSO
	ATR 833	EASA.210.0193

or other radios approved according to TSO, JTSO or ETSO for use in aircraft.

8.2.6 Variometer

Manufacturer	Type	TCDS No.
Winter	5 StVM5 (Diameter 58 mm)	TS 10.230/14
	+ 5 m/s Ident.No.. 5451	
	+1000 ft/min Ident.No.. 5452	
	+ 10 kts Ident.No.. 5453	
Winter	5 STV 5 (Diameter 80 mm)	TS 10.230/13
	+ 5 m/s Ident.No.. 5251	
	+1000 ft/min Ident.No. 5252	
	+ 10 kts Ident.No.. 5253	
Thommen	4A16() or 4A58()	
Bohli	68PVF1 or 68PVF2 in m/s	
PZL	WRS-5D in m/s	

8.2.7 Turn and Bank Indicator

Manufacturer	Type	TCDS No.
Apparatebau Gauting	WZ 402/31 12V	10.241/8
Kelvin & Hughes	KTS 0406 or KTS 0406 R	TS 10.210/19
PZL	EZS-3	

8.2.8 Electrical Supply:

Only sealed batteries may be used.

Battery in baggage compartment: Optional. Fixing to landing gear box only

Position of fuses: Either at battery or at Instrument panel.

Name: Microfuse 20x5 mm DIN 41571

Rating: 2A quick action for radios.

1A quick action for electrical variometers and turn and bank.

8.2.9 Equipment, not being part of minimum equipment:

Transponder: Units approved according to TSO, JTSO or ETSO for use in airplanes can be installed.

Installation of transponder and transponder antenna must be accomplished according to technical note DG-G-03.

Other equipment as gliding computers or loggers: These instruments can be installed, as long as it is guaranteed, that they themselves or their effect on the aircraft do not impair safe operation.

After installation a new weighing report must be filed.

Caution: When additional instruments are installed after production, these must be properly secured as long as they are not installed to a manufacturer provided position.

Electrical instruments must be connected via appropriately dimensioned fuses, current for one instrument must not exceed 3A.

9 Repairs

9.1 General

If your sailplane is damaged you should first investigate carefully the extent of the damage, which parts are involved and how the damaged area is constructed.

Normally you will find the number of layers as in the case of plywood and the type of fabric by grinding. If this method should not be possible, cut out a small piece of the damaged glass fiber and burn it. As resin only burns, you will be able to ascertain type, number and direction of the fabric layers in the damaged area.
If you are still in doubt about the construction of the damaged area, contact DG Flugzeugbau.

You should not repair on your own:

1. if you cannot guarantee technically sound work.
2. if the spar is damaged.
3. if the main fittings are torn off or cracks or white patches on the laminate appear near the main fittings.
4. if the wings, fuselage or control surfaces are broken.
5. if the mass balance of control surfaces is likely to be changed significantly during repair.

There are several possibilities to proceed for each type of repair. It is not possible to include a description of all these in this short manual.

Issued December 2009

9.2 FRP repairs

Caution: You are only allowed to use the materials specified in section 9.7.

Warning: Major damage which is outside the scope of the list below should only be repaired by an approved repair station rated for composite aircraft structure work.
For all aircraft under EASA regulations the following applies: According to part 21, subpart M to accomplish major repairs an approved repair instruction is required, see also TN DG-G-01 "Approved repair methods according to EU Commission Regulation 1702/2003 part 21, subpart M"

1. The following can be repaired:
   a. All damage to paint and putty.
   b. Holes on the belly of the fuselage if the maximum diameter does not exceed the following:
      Forward fuselage 80 mm
      Aft boom 40 mm
      Cracks in the belly maximum length:
      Forward fuselage 120 mm
      Aft boom 80 mm
      The blind glue joints of the fuselage boom should not be damaged.
   c. Holes, cracks, blisters in the wings, tail, and control surfaces not in excess of the following dimensions:

	Diameter	Length
Wings	100 mm	150 mm
Stabilator	50 mm	80 mm
Aileron	50 mm	80 mm
Rudder	50 mm	80 mm

      The parts may not be damaged in the spar area.
   d. Replacement of bent fittings.

Note: Special hints for handling FRP repairs are found in the Petite Plane Patch Primer (Author U. Hänle).

9.3 Hints for working with glass fiber and epoxy resin

Hardener and resin are toxic.

Hardener is hygroscopic, therefore store it in an airtight container with as little air as possible.

If the hardener looks like old honey (has crystallized) it has been stored at a too low temperature. Before use it should be warmed in a water bath.

Do not prepare batches of resin of less than 100g, because of possible errors in weighing, and not more than 300g, because of a possible rise in temperature due to a chemical reaction.

Errors in mixing proportions cannot be corrected.

Mixing of components must be correct (± 5%) using clean glass, porcelain jars or paper cups.

Fresh resin stains may he removed using acetone, hardened once can never be removed.

Working with epoxy resin can produce allergic reactions in some people. We suggest that you wash your hands frequently with soapy water, protect your hands with lotion and possibly with a pair of rubber gloves.

Roughen bonding area thoroughly and keep it free of dust and grease.

Use parting compound at places which should not stick together (floor wax can be used if nothing else is available).

Cut outer layers of glass fiber in steps to obtain a smooth transition of the repair area into the undamaged material.

Try to work "wet on wet", or, if not possible "wet on dry". "Dry on dry" requires a very exact fit.

Use as much epoxy resin as is necessary to avoid white patches in glass fiber but not more. Too much resin increases mass unnecessarily.

Complete hardening is essential before continuing the repair, a higher temperature speeds the hardening process.

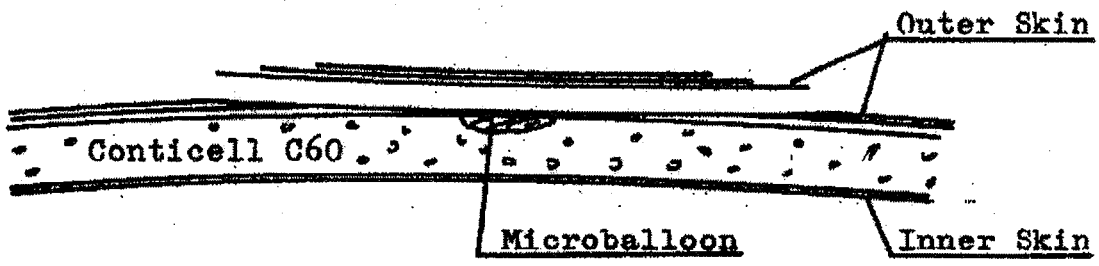
Caution: Post cure all repaired areas at min. 54° C for 24 hours.

Do not heat locally when using higher temperatures to speed up the curing process, to spread heat evenly we suggest you build a tent of plastic.

9.4 Repair of surface damage

In the case of sandwich construction - wings and horizontal stabilizer - if outer shell is damaged only:

1. Find out how far fabric and foam have separated by knocking.
2. Remove loose fabric by grinding.
3. Splice fabric around damaged area 20mm width per layer, see also section 9.7.
4. Remove grinding dust using compressed air to clean pores.
5. Close pores of foam or small holes in foam layer under outer shell with filler made from epoxy resin plus microballon (or cotton wool flocks).
6. Put patches of fabric on repair area, follow weave patterns, apply resin to each layer by dabbing with brush. Patches should be made smaller starting with the largest.
7. Trim repair after curing, prime with filler if necessary and apply gelcoat. Avoid abrasion of fabric layers during trimming.



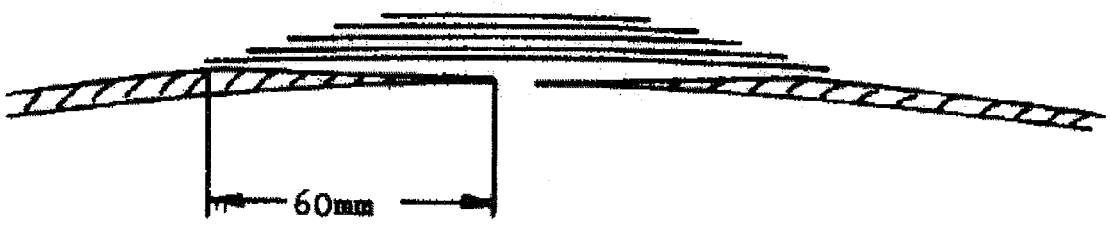
9.5 Repair of holes in sandwich shells

If also the inner skin is damaged

1. Remove outer shell as far as foam and fabric have separated.
2. Enlarge hole to a point where bond of foam and inner shell is faultless. Remove foam around inner shell hole 20mm wide per layer of glass fiber.
3. Remove gelcoat from outer shell 20 mm wide per layer. See page 18. Separate outer shell from foam for the same width using metal sawing blade. Enlarge slot with small keys to ensure resin can be applied to total area.
4. Bond shell down to foam using prefabricated pattern. This wedge surface saves splicing of outer shell.
5. Prefabricate inner shell and foam patch according to repair size.
6. After sanding the bonding area apply resin plus cottonwool flocks to inner shell with foam and close repair hole. Do not press hard.
7. Sand wedge surface after hardening. Close pores in foam with filler made from epoxy resin and microballon and put on outer shell. Do not heat during this step, as air trapped in pores may lift outer shell.
8. Trim repair after hardening, prime with filler and apply gelcoat. Avoid abrasion of outer shell during trimming.

9.6 Repair of glass fiber shells (fuselage)

1. Splice shell around damaged area at least 60mm wide. Layers and type of fabric are easily recognizable, see section 9.7.
2. Apply lavers of fabric in increasingly smaller patches (add one layer for safety).
3. Trim after hardening, avoid abrasion of layers, prime with filler and apply gelcoat.
4. Larger holes require an auxiliary shell, which may be of thin plywood, prefabricated glass fiber or foam, depending on skill of the repairer and/or available facilities.



9.7 Material list for repairs

Resin Hexion EPIKOTE ™ Resin MGS LR 285 with
Hardener EPIKURE ™ Curing Agent MGS LH 286
mixing ratio 100:40 ±2 by mass
oder
Resin Hexion EPIKOTE ™ Resin MGS LR 385 with
Hardener EPIKURE ™ Curing Agent MGS LH 386
mixing ratio 100:35 ±2 by mass

The repaired areas must be postcuered for 20 hours at a min. of 54°C (129°F) before the next take-off.

Fibre glass fabric

Interglas No.	Weave	mass (g/m²)
92 110	Twill	163
92 125	Twill	280
92 145	unidirectional	220
92 146	unidirectional	440

All fabrics - finish I 550 or FK 144

Polyester (Diolen) Fabric Manufacturer: Lückenhaus

No.	Kind of weave	mass(g/m²)	Usage
34048	Linen	206	Fuselage

Fibre Glass Rovings
EC 14-2400-P 185 with Silan finish

Foam Diab Divinycell H 60 colour green

Paint UP (Polyester Gelcoats)
akzo Nobel UP Schwabbellack 03-69066 with hardener 07-20510
mixing ratio: 100:2
Up to 10 % thinner 0630260 can be used.

or Hexion T35 with hardener SF 2
mixing ratio: 100:2-3
Up to 10 % thinner SF can be used.

or PUR paint if such paint was optionally applied

Glue for Plexiglas
To attach the canopy:
glue Teroson Macroplast UK 8303B60
hardener Teroson Macroplast UK5400
mixing ratio: 6 : 1 by mass
thickened with Aerosil.

To repair cracks in the canopy:
Röhm Acrifix 92 which hardens by exposure to light.

Filler
For glueing, the resin-hardener mix should be thickened with chopped cotton fibres FL l f. (add enough so that the resin no longer flows). The surfaces to be glued should be wetted with non-thickened resin + hardener before.

To glue foam pieces into place when repairing sandwich sections and to fill in irregularities and gaps etc. around the repair, Microballoon BJO - 0930 can be used mixed with the resin + hardener. Application and mixing is the same as for the cotton flocks.

Sources for material
All materials can be obtained from the DG Flugzeugbau Factory.

9.8 Types of materials and overlap dimensions

Caution: strengthening at especially stressed places are not listed.

Part	Interglas Number	Number of layers	Weave Direction	Minimum Splicing Width
LS3				
Wing, outside	92145	2	diagonally	40mm
outside*	92145	1	longitudinally	
inside	92125	1	longitudinally	20mm
Fuselage	92125	1	longitudinally	60mm
	92125	3	diagonally	
	92146	1	longitudinally	
Flaperon	92110	5	diagonally	40mm
elevator + rudder	92110	2	diagonally	40mm
LS3-a and LS3-17				
Wing, outside	92145	2	diagonally	40mm
inside	92110	1	longitudinally	20mm
Fuselage	92145	1	longitudinally	60mm
	92125	3	diagonally	
	92146	1	longitudinally	
Control Surfaces	92110	2	diagonally	40mm
all variants				
Horizontal Stabilizer, outs.	92110	1	diagonally	40mm
outside	92145	1	longitudinally	
inside	92110	1	diagonally	20mm

Caution: In the rear fuselage shell a layer of Diolen-fabric is installed between the glasfibre-layers. In case of repair replace this layer by 2 layers of glasfibre 92125.
In the flaperon- or aileron- and wing flap-shells two layers of Diolen-fabric are installed between the glasfibre-layers. In case of repair replace these layers by 4 layers of glasfibre 92125.
Diolen layers are well visible during scarfing.

9.9 Repairs of Metal Fittings

Repairs of Metal Fittings should not be performed before the manufacturer has been consulted. Most fittings are made from 1.7734.4 aircraft material and welded in 141-WIG process (Shielded arc welding). In no case should they be gas welded, because required properties of the material will disappear.

9.10 Control cables and connections

For processing Nicopress sleeves refer to FAA "Aircraft Inspection and Repair" FAA AC 43.13-1 A or later issue

1. Rudder cables

   Cable: B 3.2 MIL-W-83420 I/A resp. ISO 2020 (former LN9374) zinc plated
   Steel thimbles: A 3.5 DIN6899
   Cable sleeves: Nicopress NT 283M (28-3-M), 3 pressings required, with tool groove Oval M tool 64-CGMP
   Turn buckles: A5 LN9358
   Securing turnbuckles: stainless safety wire dia. 0.8 mm LN9424

2. Tow hook operation, wheel brake, waterballast control

   Cable: A 2.4 MIL-W-83420 I/A resp. ISO 2020 (former LN9374)
   A 2.4 LN9389 corrosion resistant (C.G. hook)
   2.5 DIN3055 corrosion resistant with steel core (C.G. hook)
   Steel thimbles: A 2.5 DIN6899
   Cable sleeves: Nicopress NT 282GA (28-2-G), for pressing use tool groove Oval G of tool 64-CGMP. 1 press (
   Stop sleeve: Nicopress NT S117J (871-17-J), use tool groove "J" of tool 51-MJ 1-press

9.11 Longitudinal motion pushrod bearings

During repairs, never pull pushrods out of longitudinal motion bearings, because all balls will leave their cages. Consequently, for re-installation near each bearing an opening must be cut and repaired afterwards.

These bearings are being used throughout the wing control systems, in the fuselage for elevator-, aileron- and landing gear drive systems.

Caution: Longitudinal motion pushrod bearings should never be greased or oiled, their plastic balls and bearing surfaces will soon be destroyed due to collection of small foreign matter !

9.12 Recommendations to maintenance and care of gelcoat surfaces

according to paint manufacturer Lesonal's note dated 7.7.81:

Suitable: Water with washing,-up liquid added in recommended quantities, car polish with or without silicone

Suitable with reservations: Tar remover based on petrol for cars. Alcohol, like spirit or isopropyl alcohol. Reservations are, that these liquids should only be used for wiping off, not for soaking with rags!
Unsuitable: Strong solvents and thinners, they may decompose gelcoat and cause local shrinking.

Completely unsuitable: Trichloroethylene, carbon tetrachloride or similar hydrocarbon chlorides. These liquids destroy the gelcoat.

Other mediums must be checked for suitability by Lesonal before use!

Warning : Sanded gelcoat shows distinctive weathering marks due to changes of temperature, ultra violet radiation and humidity unless regularly polished with hardwax.

10 Enclosures

10.1 Annual inspection checklist

Page 1 of 3

Serial No.:	Reg. Signs:	Year of Manuf.:

	Wings				Fuselage control system
	Serial No.: _____		Main pins		Control stick
	Finish condition				Aileron system
	Wings pressure marks		Wing water system		Aileron-flap mixer
	Spar stub		Function + tightness		Aileron ball snap joints
	Root ribs and pins				Flap drive
	Sandwich shell condition		15 m tips		Flap autom. hook up
	Drain orifices		17 m tips		Air brake system
	Connecting means				Air brake autom. hook up
	Ailerons*		**Horizontal Tail**		Elevator system
	Aileron pressure marks		Serial No.: _____		Trim handle
	-Cracks / buckling		Finish condition		Rudder pedals
	-Drives at ailerons		Sandwich shell condition		-Adjustment + locking
	-Drives at root ribs		Stabiliser ventilation		Rudder cables
	-fixed bearing + washer		Elevator ventilation		Turnbuckles
	-Bearings		Elevator drive lever		Securing of turnbuckles
	-Lateral bearing gaps		drive bearings		Water ballast system
	-Lateral gaps		Bearings		Fuselage miscellaneous
	outboard 2 mm (0.08 in		Fuselage connection		Ground connections
	-Sealing		Connecting means		Backrest adjustment
	-Stops				Headrest adjustment
	-ball head				
	-Ventilation		**Fuselage**		Trim weight holder
	Wing flaps*		Serial No.: _____		-Fixing means
	Wf pressure marks		Finish condition		
	-Cracks / buckling		Shell condition		Nose hook fitting
	-Drives at root ribs		Cracks		-Drive
	-fixed bearing + washer		Drain orifices		
	-Bearings		Rudder mounting		Tail skid – cable deflector
	-Lateral bearing gaps		Stabiliser mounting		at front end
	-Lateral gap to aileron		Tangential tubes		-Skid bonding
	4mm (0.16 in.)		Bushes for wing root pins		
	to fuselage 2 mm (.08 in.		Cockpit		Connecting means
	-Sealing		Seat		**only LS3-a and LS3-17**
	-Ventilation		Under seat		L'hoteller quick connects
	Air brakes		Lap belt fixing		and securing means
	Air brake bearings				
	-Corrosion at levers				
	-Cover springing				
	-Autom. hook up at roo				
	-bevel gear				

***LS3:** use inspection items for flaps for the flaperons

Place: _____ **Date:** _____ **Stamp:** _____ **Signature:** _____

Annual inspection checklist

Page 2 of 3

Serial No.:	Reg. Signs:	Year of Manuf.:

	Canopy		**Equipment**		**Adjustments**
	Serial No.: _____		Minimum instrumentatio		Wings and horizontal tail
	Locking mechanism		Additional Instrumentati		Tangential play
	Emergency release funct.		Operating range marks		Zero position of controls
	Window		Limit marks		Control surface deflections
	Ventilation system		Vacuum flasks		Max. air brake extension
	Canopy fixing system		Pneumatic tubing		and locking
	Gas strut operation		Instruments functioning		Wheel brake
	With TM 3054:		Total energy unit		Trim system function
	LS latch (for emerg. release)				Nose hook system
	force :____ (8-15 kg)		Systems free from leaks		C.G. hook system
	(18-33 lbs)		Total pressure		C.G. hook automatic release
			Static pressure		Ballast system function
	Rudder		T.E. system		Absolutely tight?
	Finish condition				Control surface friction
	Shell		Electrical wiring		Control surf. Rear edge play
	Ventilation openings		Battery + fitting		**only LS3-17**
	Drive		Battery main fuse		cable to limit flap setting
	Fixed bearing + washer		Radio		to 0°
	Bearings		Antenna system		.
	Connecting means		Communication check		**General**
					Registration signs
	Landing gear		Seat belt harness		Nationality marks
	Undercarriage + axle		Op.Limit: _____		Fireproof type placard
	Tyre		Data placard/trim plan		External colour marking
	Springing		Placards accord. to Main		Checklist
	Gas strut		Manual		Minimum cockpit load
	Damper		Compass deviation list		Flight Manual
	Bearings + joints		Baggage comp. cover		Maintenance Manual
	Folding strut overcenter		Fixed ballast at front/rea		AD status
	Folding strut preset load				Cert. of Airworthiness
	Doors		**Hooks**		Logbook notation
	Drive rods		C.G. hook		Placard notations
	Cockpit locking		-Function + automatic re		TB-AD-List up to date
	Connecting means		-Serial No.: _____		
	Wheel brake system		-Op.Limit: _____		Non-exist. of foreign matter
			Nose hook function		
			-Serial No.: _____		
			-Op.Limit: _____		

Place: _____ **Date:** _____ **Stamp:** _____ **Signature:** _____

Annual inspection checklist
Page 3 of 3

Serial No.:	Reg. Signs:	Year of Manuf.:

	Check wing air brake levers for corrosion at lower end.
	Pull with about 25 kg <55 lbs> force at upper end of each lever in flight direction, simultaneously retract without twisting upper member (do not counter hold at cockpit lever!).
	When under load of last item locking at wing structure results, then bearings at related lever must be exchanged immediately by repair station according to repair instruction "Air Brake Levers".
	Bearings should be exchanged within 6 months, when corrosion is clearly visible, but no locking or jamming occurs.

	Valid C.G. weighing dated _____		**Flight Hours**		Entry of Cockpit Load in Cockpit + Flight Manual 6.2 checked, unaltered
	Valid Equipment List dated _____		Total _____ hr.		changed to _____ kg/lbs
			Last Ann.. _____ hr.		
			Take-offs		
			Total _____		
			Last Ann.. _____		

	Permanent installation of equipment in baggage compartment according to section 7
	Special inspection hints according to chapter 3 taken care of
	Technical Bulletins performed: _____
	AD's performed: _____
	TB-AD-List updated
	Life time limits / Repetitive Inspections taken care of, see MM section 0.4

Findings / Complaints / Remedy

No.	Findings	Remedy / Repair	Inspector

Place: _____ **Date:** _____ **Stamp:** _____ **Signature:** _____

10.2 Supporting areas for road transport etc.

Fuselage: Tail skid, wheel and shell in front of landing gear, if support is of least 300 mm (11.8 in) wide.

Wing: Spar close too or at the main pin bush near wingroot.
Shell at root, if support is at least 150 mm (5,9 in) wide.
Shell at two third of halfspan, if support is at least 150 mm (5.9 in)wide.

Horizontal tail: At any place, if support is at least 80 mm (3.15 in) wide.

SUPPORTING AREAS TO LIFT WHOLE SAILPLANE

1. Under wing spar, not under nose section.
2. Under fuselage shell in front of wing.
3. Under fuselage shell behind wing.

10.3 Instruction for maintenance of L'Hotellier ball and swivel joints

DOCUMENT IMA N° : 10.01 Rev : E		E08-A

INSTRUCTIONS FOR THE MAINTENANCE L'HOTELLIER BALL AND SWIVEL JOINTS

HISTORIQUE DU DOCUMENT

REV.	DATE	OBJET DE LA MISE A JOUR	RED.	QUAL.	RESP.
A	11/85	Creation of document	BE	MJD	JMB
B	02/86	Representation of 1 swivel	BE	MJD	JMB
C	01/89	Adjunction of Fig.1 and Fig.2	BE	MJD	JMB
D	07/92	Updating of function of CR147	BE	MJD	JMB
E	03/94	Updating following DEI229-EM	BE	MJD	JMB

LISTE DES DESTINATAIRES

B.E. B.C. Q.C. B.C. Q.C. C.B.	OR. +1 EX. 1 EX. 1 EX.	PRODUCTION	1 EX.

Louis L'HOTELLIER S.A.
93, avenue Charles De Gaulle - 92270 BOIS COLOMBES
Tél.(1)42.42.13.94 Télex 611153F LHOTAIR Télécopie (1)47.60.07.07

RED. : BE DATE : 03/94
PAGE : TIT IND. : E

DOCUMENT IMA N° : 10.01	INSTRUCTIONS FOR THE MAINTENANCE L'HOTELLIER BALL AND SWIVEL JOINTS	E08-A

COMPOSITION DU DOCUMENT

PAGE	IND.	PAGE	IND.	PAGE	IND.	PAGE	IND.	PAGE	IND.
TIT	E	SOM	E	1	E	2	E		

SUMMARY

Louis L'HOTELLIER S.A.
93, avenue Charles De Gaulle - 92270 BOIS COLOMBES
Tél.(1)42.42.13.94 Télex 611153F LHOTAIR Télécopie (1)47.60.07.07

RED. : BE DATE : 03/94
PAGE : SOM IND. : E

DOCUMENT IMA N° : 10.01	INSTRUCTIONS FOR THE MAINTENANCE L'HOTELLIER BALL AND SWIVEL JOINTS	E08-A

1 - PREVENTIVE AND SAFETY MAINTENANCE INSTRUCTIONS

The rotation of the swivel around the ball must be done with resisting strengh, due to minimum frictions. Consequently it is mandatory to lubricate the swivel/ball assy. This lubrification must be done after cleaning and before assembly, with a non cold coagulating grease.

Eg : ESSO purpose (general use) :
Spray containing oils enriched with silicone (recommended for assemblies exposed to sand or other abrasive materials).

It is mandatory to verify, after each assembly, the correct location of the ball in the swivel. To do so, a location hole is drilled in the locker. When the assembly is good, the hole must be visible and must enable to insert the pin "B" réf. L'H 140-31, or other devices, linked to the locker only.

2 - PERIODICAL CHECK

During the annual visit or no later than every 500 flight hours, it is necessary to verify balls and swivels as follows :

2.1. FREE MOVEMENT OF THE BALL INTO THE HOUSING

- Check that the ball move free of friction point.
- Check the angular displacement.
- Check that there is no crack at the base of the ball

2.2. BALL SPHERICITY MEASUREMENT (See fig. 2)

The variation between several measures of the ball diameter must not exceed 0,1 mm.
This check aim is to detect an abnormal ball wear.

2.3. BALL THREAD CHECK

No thread damage is acceptable. During reassembly the collar must be perfectly set on its base. It is mandatory to fix the ball in position with an adequate locking device.

2.4. SWIVEL VISUAL CHECK

No deformation or penning in ball location or in the locking device seat is acceptable.

2.5. MEASUREMENT OF THE LOCKER LOWER PART PROJECTION AFTER ASSEMBLY OF THE SWIVEL ON THE BALL (see fig. 1)

This projection must be higher than 2 mm.
The aim of this requirement is to verify the efficiency of the automatic take up clearance

DOCUMENT IMA N° : 10.01	INSTRUCTIONS FOR THE MAINTENANCE L'HOTELLIER BALL AND SWIVEL JOINTS	E08-A

2.6. CHECK OF THE LINK BETWEEN DRIVE ROD AND SWIVEL

In the case of an adjustable swivel, verify that the link between swivel and drive rod is tight and properly secured by an adequate locking device.

2.7. SWIVEL ASSY OPERATION CHECK

Seat or locker : no clamping, due to oxydation or other reason, is acceptable.

If after these verifications, one of the above check is out of tolerance, it is mandatory to replace both ball and swivel.
nevertheless it is recommended to replace this assembly every 10 years or every 3000 flight hours.

IMPORTANT NOTE

Any defection parts may be returned to Ets Louis L'HOTELLIER for technical investigation.

FIG. 1

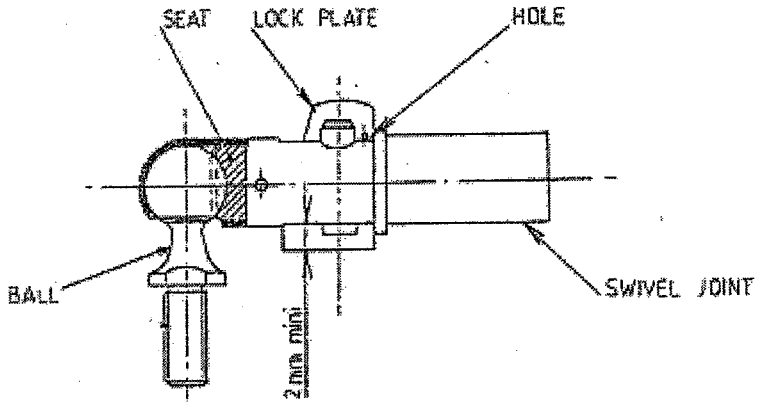


FIG. 2